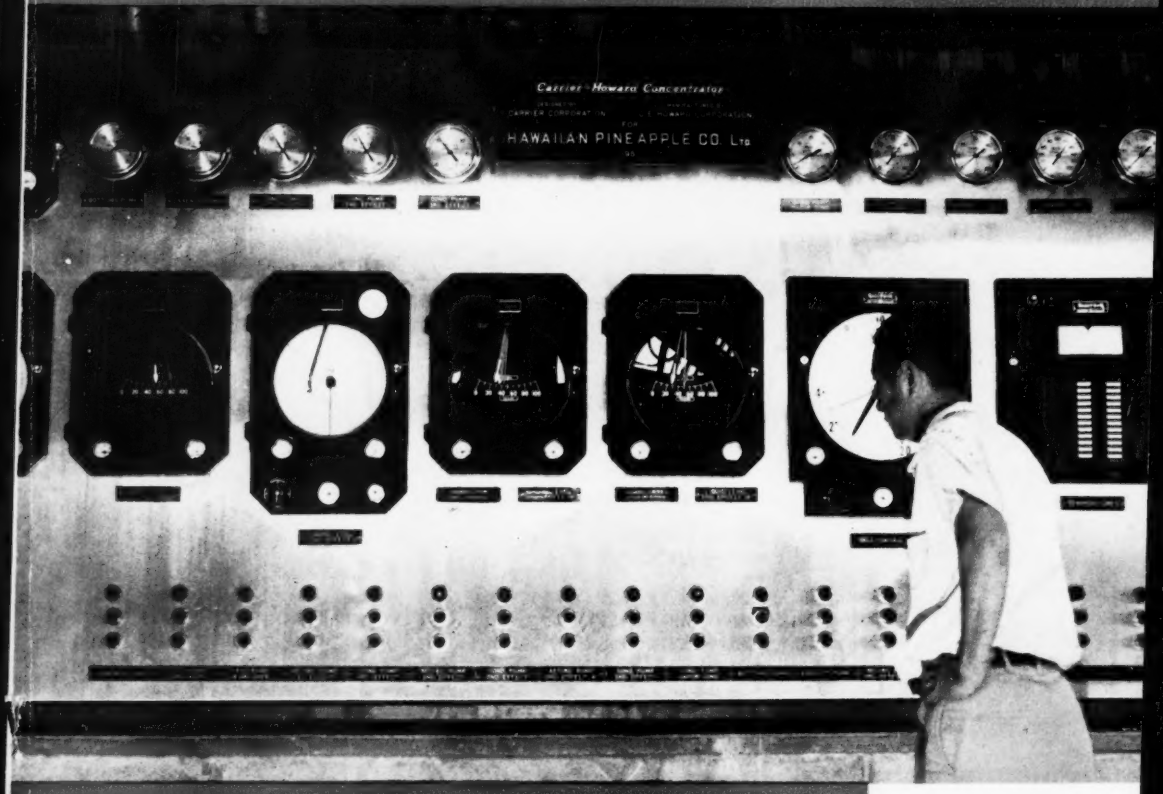
FOOD ENGINEERING

August 1952

A McGRAW-HILL PUBLICATION • FORMERLY FOOD INDUSTRIES

35 CENTS



AUTOMATIC CONTROL panel is heart of Dole's new process for frozen concentrated pineapple juice. Page 72

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Let one sheave do the job of 2 or 3!

WHY DISMANTLE DRIVES and change sheaves every time you want to change machine speed? In fact, why have extra sheaves lying around cluttering up the shop? Just one *Vari-Pitch* sheave will give you hundreds of speed variations. Don't be satisfied with "nearly" the right speed when you can get the "exact" speed you need so easily.

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- ✓ Machine speed will not change once it is set.
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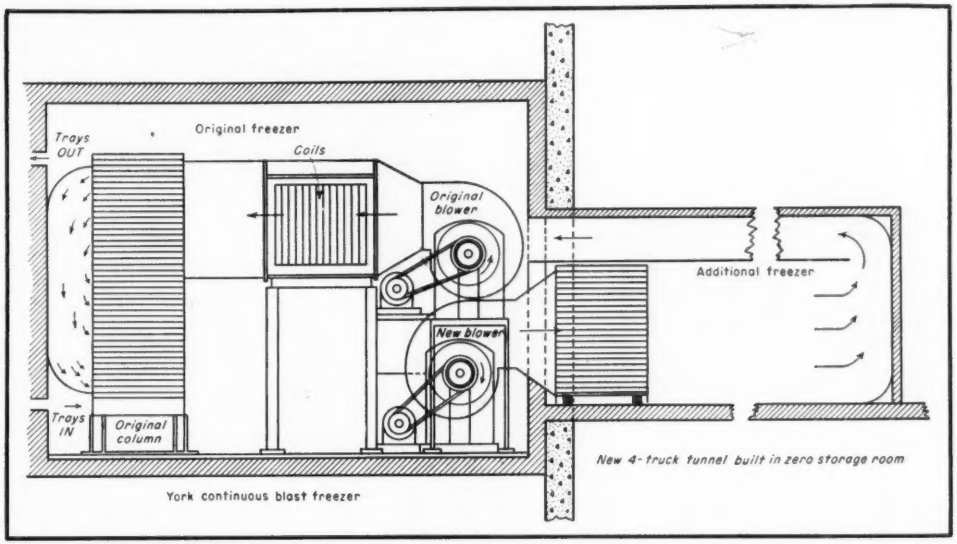
PRACTICAL IDEAS



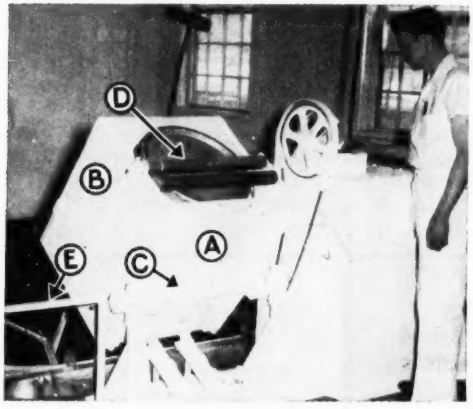
Freezer Output Doubled

By extending the length of our existing freezer and directing the low temperature air from the original freezer into the addition, we doubled output with no increase in the capacity of refrigeration compressors.

Original installation (see sketch), designed for "loose-freezing," had excellent delivery efficiency for its intended capacity. However, when we froze products in-the-package, capacity was cut in half and costs increased proportionately.

Then we built the extension and added a duplicate boxed-in blower with damper controls to direct the blast from the original freezer into the extension and back to the primary blower. And now "freezing-in-the-package" capacity is the same as the original loose-freeze volume.

The original two refrigeration compressors—75 hp. each—have proved adequate for present package freezing. The only increased production costs is for the power driving the new 20-hp. blower motor.—*Ellis R. Warner, Doylestown, Pa.*



Handy, Sanitary Barrel Dumper

Two drum-dumping problems were solved at our plant by the installation of a mechanically operated container-tipper.

First problem was to reduce the back-straining labor that had been required for emptying the contents of 250-lb. stainless steel drums of powdered milk. Second was the need to prevent dust on the outside of the drum from contaminating the product as it flowed from the container

This is how the problems were solved: A box-like dumper unit—(A) in photo—was constructed to incorporate the hinged front (B). And this unit was attached to a shaft (C) for power driven rotation of box about the axis. Installed at the bottom of dumper (seen here turned up) is a pair of rollers (D) which in pre-use position of the dumper, serve as an extension of the roller-conveyor on which drums are brought to the unit.

To empty a barrel, the front (B) of the box is opened, a drum with lid removed pushed inside, and the hinged front closed. Then, by pushbutton control, the barrel holder is turned on the shaft until it is in discharge position over the chute (E).

When the drum is tilted beyond the horizontal, it slides against the dumper top, where it makes a snug fit. Thus, any foreign material on the outside of the drum is retained inside the box, preventing contamination.

The product flows through a spout-like hood on the bottom of the dumper when the unit is rotated for discharge. —*J. L. Becker, Plant Manager, Maple Island, Inc., Stillwater, Minn.*

Look for the distinguishing darkened rollers.
Thousands of tiny steel balls hammer the metal—"cold work" each roller . . . pay off in extra fatigue life . . . added ability to withstand shock and impact.

It's the SHOT-PEENED rollers that give your roller chain extra life!

. . . one of the extra-wear features you get with every LINK-BELT Roller Chain

POWER-TRANSMISSION engineers and metallurgists agree—shot-peened rollers mean longer roller chain life. That's just one of the engineering extras you get with Link-Belt Precision Steel Roller Chain. Another is Link-Belt's exclusive lock-type bushing.

Remember, too, Link-Belt's rigid material selection and controlled heat treating assure chain uniformity . . . no weak members.

Link-Belt builds a complete line of roller chain—single or multiple widths in ⅜" through 3" pitch; and double pitch, 1" through 3". Submit your chain problems to the Link-Belt office near you.

No partial bearing here —bushing fits securely

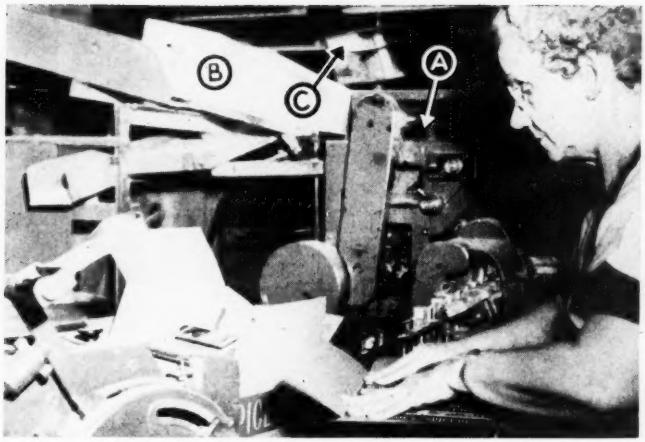
Lock-type bushings increase ability to withstand severe operating conditions

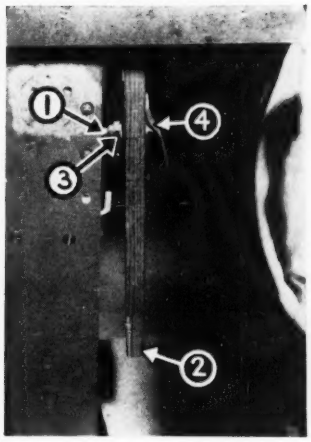
A special manufacturing process securely locks the inside sidebars on the bushing, preventing lateral movement of the sidebars and eliminating a common cause of stiff chains. This Link-Belt development is applied on roller chains through 1" pitch and double pitch roller chains through 2" pitch.

LINK-BELT

Precision Steel Roller Chain

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). Offices, Factory Branch Stores and Distributors in Principal Cities. 12,805





Knee-Operated Switch Cuts Fatigue

When we relocated the electric control operating a package line feed, we not only reduced interruptions in operations but also minimized operator's hand movements and discomfort.

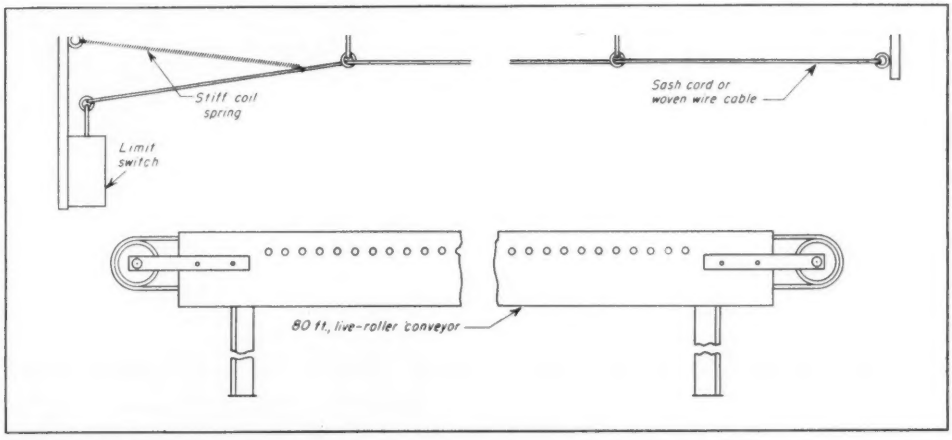
The "Spice Drops" packaged on this line are supplied to the filling-closing machine hopper— (A) in left photo —by a mechanically vibrated feed (B). Consumer packages delivered from the machine are then hand packed into cases.

In order that the case packer can maintain an adequate supply of candy in the filling-machine hopper, a mirror (C) is placed so she can see at a glance the gum-drop level.

Formerly, in order to replenish the hopper supply, it was necessary periodically to start the shaker by closing a hand operated switch, thus dividing operator attention and interrupting case packing.

Now, since the control switch—(1) in right photo—has been located under the packing table, operating the vibrator feed has been simplified. Knee pressure against a lever (2), hinged to the bottom of the table, starts the shaker feed.

A bolt (3) through the lever engages the switch to close it when the lever is pressed. Attached to the latter, so as to cover the bolt on the operators side, is a leather strip (4) which prevents discomfort or injury.—*A. B. Putzel, Superintendent, Quaker City Chocolate & Confectionary Co., Philadelphia.*



Conveyor Operation Made Safe

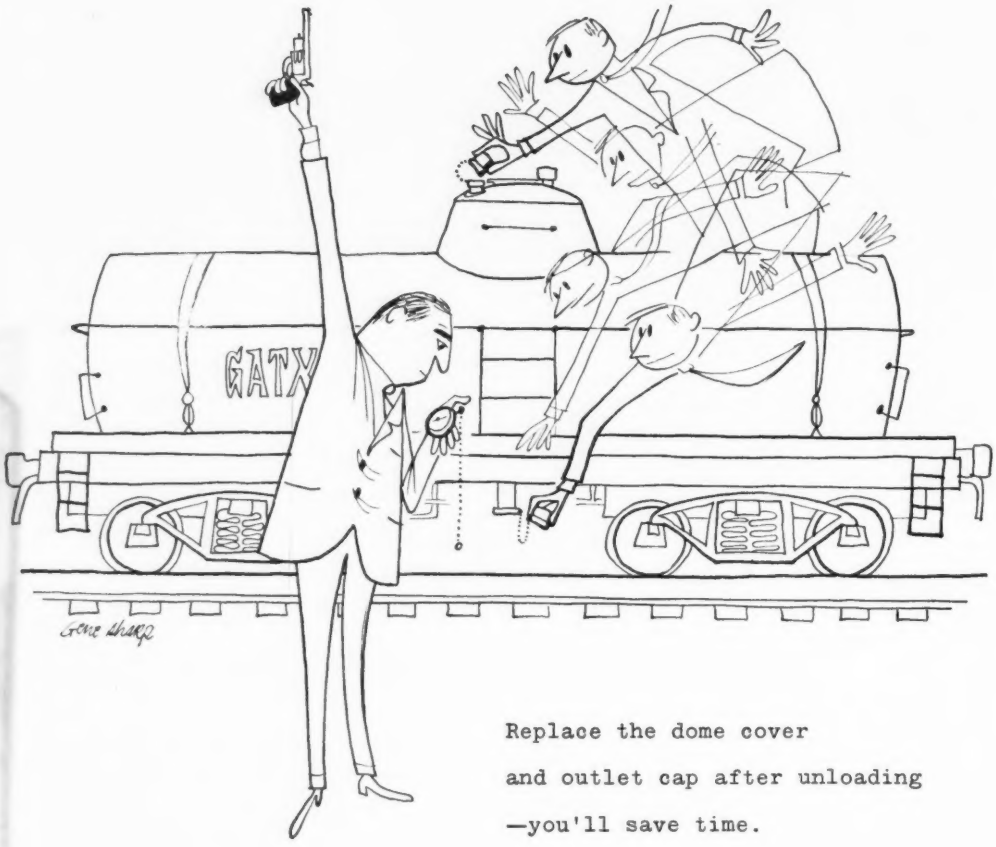
Installation of an overhead cable, attached to a limit switch, has made it possible to stop an 80-ft. live-roller conveyor from any place along its length, thus avoiding accidents and damage to product or the conveyor.

Though several stop-switches were formerly located along the conveyor, too often in emergencies, damage resulted before one of the stop-buttons could be located.

Now, from any location along the conveyor, an operator can reach up, pull on the cable (see sketch), and instantly stop the conveyor motor.

One end of the cable is anchored, while the other is attached to the limit switch, which returns to closed-circuit-position when the cable is released. A strong spring, one end of which is fastened to the cable and the other to the arm of the limit switch, speeds re-start.—*Oscar Andersen, Theo. Hamm Brewing Co., St. Paul, Minn.*

THE CARE AND NURSING OF TANK CARS



Replace the dome cover
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—you'll save time.

Another way to get more from your GATX tank cars

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So many people have requested reprints of these cartoon advertisements that we are making them available to you for use in your shops. Just write us.

Paint On Aisles Spurs Housekeeping

Keeping our plant runways and aisles always freshly painted and polished has paid dividends in general plant cleanliness.

The painting of all process floors would, we knew, encourage good housekeeping. However, the nature of our processing made such all-out painting impracticable. The next best approach was painting aisles (see photo).

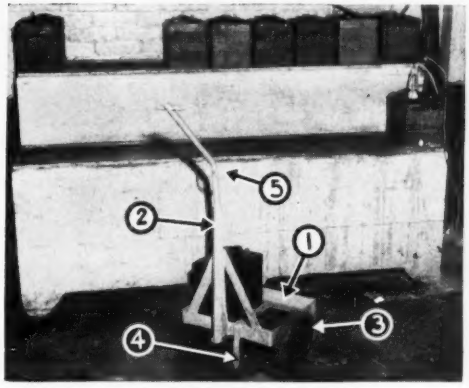
Results have been better than expected. The spick-and-span aisles have stimulated cleanliness and good housekeeping throughout the processing areas.—*D. B. Bradshaw, Plant Engineer, A. H. Johnson Co., Boston.*

Truck Speeds Monorail Movements

Employment of a small electric truck to replace hand labor for moving hog carcasses suspended from a monorail conveyor has reduced the cost of the operation in a large meat packing plant.

Small in size, with a 4-wheel steer, the truck, built by Elwell-Parker Electric Co., Cleveland, has short turning radius, and is therefore quite maneuverable, making it possible to "cut-into" a row of carcasses at any desired point. Addition of a pushing frame made of pipe (see photo) facilitates the "cut-in".

As many as 20 carcasses can be moved at one time.



Home-Made Truck-Battery Cart

A two-wheel carriage we designed for transporting automotive batteries has proved not only a safe device for handling them, but has also saved us many man-hours.

Here are details on the cart and its use:

Made of welded angle-iron mounted on larger casters, the carriage bed—(1) in photo—is designed to transport

$50 Extra for Best Item

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get an additional payment of $50.

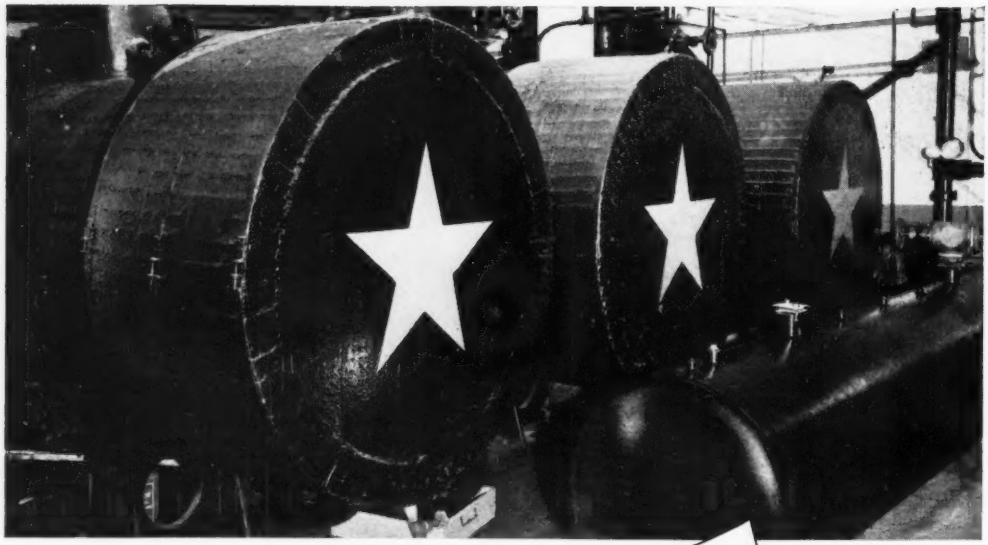
Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

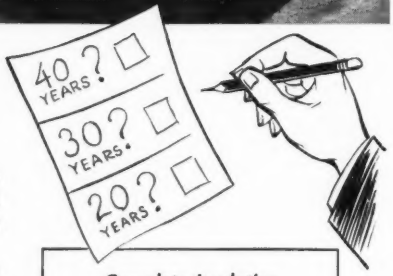
You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

JUNE PRACTICAL IDEA voted best was "Electric-Eye Man-Lift Control," submitted by J. George Kehr, Superintendent, Russell-Miller Milling Co., Buffalo. Discussed was an "eye"-type safety device that averts personnel injuries by stopping man-lifts whenever passengers fail to dismount at top-floor stations.



Can you guess the age of this insulation?



A good insulation job never looks its age. The cork lagging on these brine coolers, for example, seems almost new. It is still dry, highly efficient, and shows no signs of deterioration. Yet this insulation was installed in 1912—40 years ago!

These tanks are part of the equipment at the Memphis Cold Storage Warehouse Company. In that warm, humid climate, 6″ of Armstrong's Cork Lagging has held temperatures of 12° below zero at remarkably low refrigerating costs. The lagging has proved its superior moisture resistance despite the wide temperature differential outside and inside the vessels. The only maintenance has been occasional inspection of the bands and periodic painting with asphalt paint.

It takes the right combination of sound engineering, top-quality materials, and expert application to give that kind of service. But when Armstrong's Corkboard, Lagging, or Cork Covering are used, records like this aren't unusual. Today, hundreds of cork installations across the country are performing efficiently after 20, 30, and even 40 years of service!

Low-temperature insulation is a long-term investment. That's why it pays to contact Armstrong whenever you're planning any insulation job. We offer a complete line of the finest insulating materials and the skilled workmen to apply them properly. You get an insulation job that gives years of economical, trouble-free service. For further information, just contact your near-by Armstrong office or write direct to Armstrong Cork Company, 2308 Concord St., Lancaster, Pa.

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When you engage a contractor, you have a right to expect certain things that cannot be written into a proposal. These factors can largely determine whether or not the agreement will be entirely satisfactory. They include:

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2. Integrity — a reputation for quality work and for prompt settlement of any justified complaints.

3. Technical ability — experience, plus technical and research staff to complete the work in accordance with best practices.

4. Manpower resources — trained supervisors and workmen able to handle any contract efficiently.

5. Efficiency — ability to handle accurately things like accounting, tax provisions, insurance, and workmen's compensation.

You get all these with an Armstrong Contract

Armstrong's INDUSTRIAL INSULATIONS

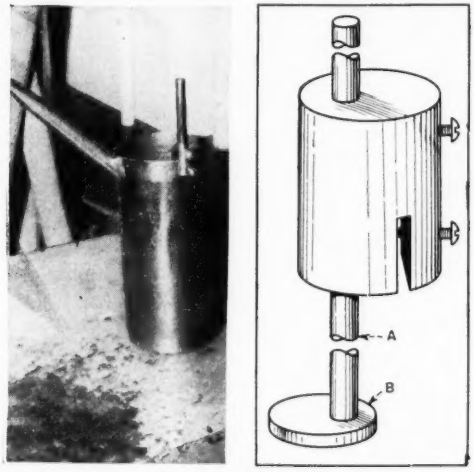
For temperatures from 300° below zero to 2800° F.

two batteries at a time. The handle (2), made of angle-iron and pipe, extends up from the bed at a 90 deg. angle, so that during transportation the carriage will be tilted, thus lifting the legs (3), clear of the floor.

Even though the axle is located near the rear of the bed in order to make the assembly stable when not in motion, an additional safety device was added. When swung down, the pivoted length of strap-iron (4) prevents tilting or overturning of the unit. When the cart is to be wheeled, the support strap is lifted (by foot or hand) to rest against the handle (3).

Handy for moving batteries to and from the charging rack, the cart has also been employed in many emergencies—such as when trucks or cars have been stalled even as far as several blocks from the plant. In such cases, a battery with cables attached has been quickly wheeled to the distressed vehicle for rapid starting.

To prevent battery-attached cables from making contact, and also to see that they do not drag on the ground, two hooks (5) are extended out from the handle on which to loop the cables.—*James Owens, Milk Truck Supervisor, Abbotts Dairies, Inc., Philadelphia.*



Shop-Made Ingredient Gage

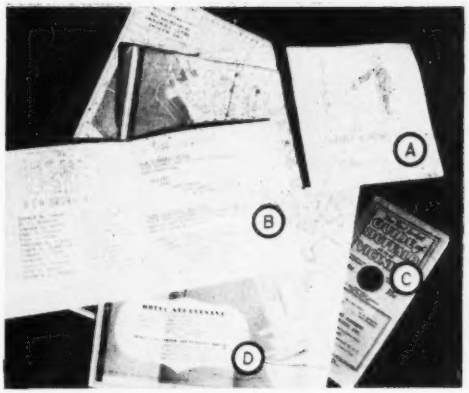
Through use of a measuring device made in our plant, accuracy of jam and jelly ingredient proportioning is assured and the make-up operation speeded.

Furthermore, the number of different size measuring units is reduced, therefore delays searching for those with the correct proportions are reduced.

Construction of the gaging device is simple. It consists of a metal cylinder (photo), slotted to fit over the lip of a large-size measuring cup. Cylinder is made fast by tightening a set screw.

Through a hole bored in the cylinder, an adjustable metal rod—(A) in sketch—extends into the cup. To the bottom end of the rod is welded a metal disk (B) of approximately 1 in. dia.

Now, when an ingredient is to be added in small measured amounts to successive batches, the first portion is carefully weighed, or otherwise calculated, and poured into the gage cup. Then the disk on the end of the rod is lowered to liquid level and secured in place by set screw. Ingredient portions for successive batches are accurately prepared by filling the cup to the disk level.—*F. T. Ogle, Plant Engineer, American Preserve Co., Philadelphia.*



Courtesy Booklets Save Time

Just by placing in our reception room, a stock of mimeographed booklets—(A) in photo—containing pertinent information about our company and its operations, we conserve both the time of our visitors and that of personnel in our organization responsible for management and plant operations.

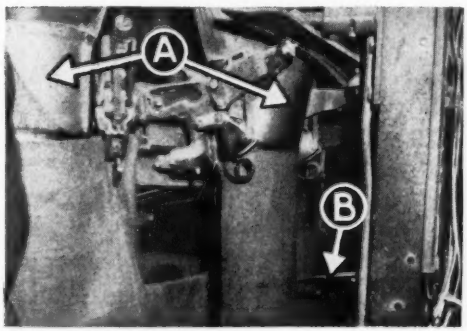
We believe the booklets, cost of which was small, also serve to promote goodwill.

In addition to a welcome to visitors, the booklet when opened (B) conserves time by listing, with titles, the heads of departments, also products manufactured, sales territories, and methods of distribution.

Now, visitors are less likely to call the wrong individual to the lobby. Also, "missionary" interviews that benefit neither buyer nor seller, are less frequent.

On the first page of the booklet, along with the company's welcome, is its offer of the courtesy of receptionist aid in summoning a taxi or making a phone call. In addition, a street guide of Buffalo (C), with map (D), is convenient on a table.

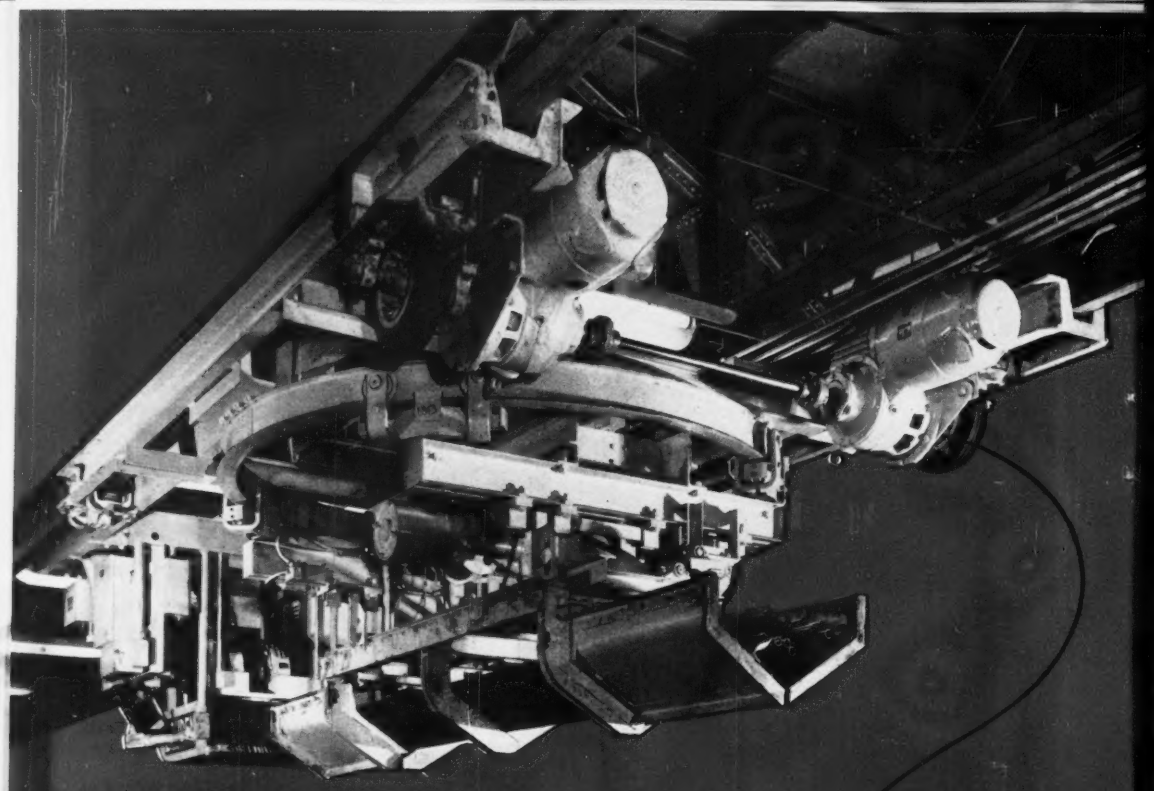
Visitors now rarely need ask, "How do I get from here to—", for all information is ready at hand.—*Robert P. Korn, Plant Engineer, Henry & Henry, Buffalo, N. Y.*



"No Bag-No Fill" Device

By adding a pivoted rod, so arranged that it operates an electric control, we prevent the discharge of prepared feed whenever a bag is not in place for filling on our multi-spout machine.

Formerly, the flow began as a spout passed a certain



You can't beat the combination of the RIGHT horsepower, the RIGHT shaft speed, the RIGHT features all in one compact unit that you can use RIGHT where you want it. It's the best way and the easiest way to select your power drives because you purchase one unit, handle one unit in your receiving, production, and maintenance departments . . . set one unit in place and you're ready to go.

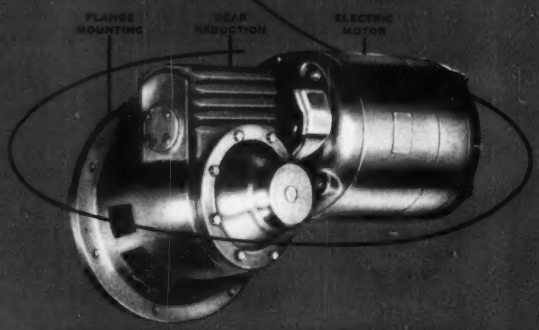
Master Motors, available in thousands and thousands of combinations of types and ratings, permit you to use a power drive that will add greatly to the compactness, appearance, and economy of each of your applications . . . a power drive that makes a good job better.

Use Master Motors to increase the salability of your motor-driven products . . . improve the economy and productivity of your plant equipment. They're the horsesense way to use horsepower.

THE MASTER ELECTRIC COMPANY

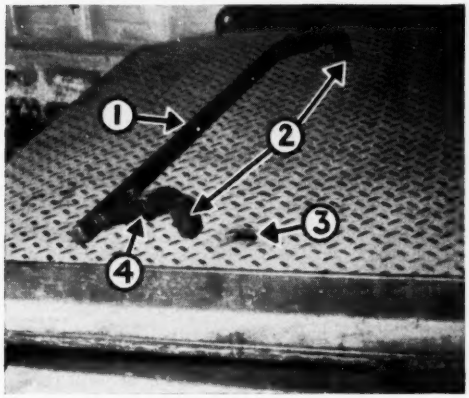
DAYTON 1, OHIO

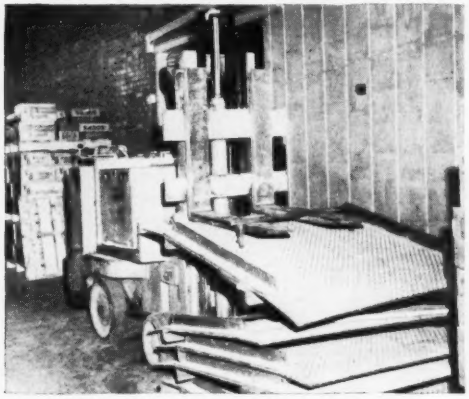
makes a good job better



point in its rotation. If no bag covered the end of the outlet, the feed spilled on the floor.

Now, bags which are manually clamped to the rotating filling spouts—(A) in photo—engage a pivoted arm (B). Weight of the moving bag swings this spring-returned arm on its pivot to engage an electrical switch that controls the flow of feed into the bag. If there is no bag, arm remains stationary and no feed is discharged.—*A. F. Wenske, Assistant Superintendent of Maintenance, Eastern States Milling Co., Buffalo.*





Sturdy, Easy-to-Make Car-Plate Lift

Fashioned from 1-in. sq. stock, the car-plate lift-bar we fabricated can be attached to the plates quickly, and it is adequately rugged for heavy duty handling.

Used to span the area between railroad cars and loading docks, the plates (left photo) carry the weight of a fork lift truck and its load. Made of thick metal, strongly reinforced, they are too heavy to be juggled about by hand.

Hence, the pick-up device to do the trick. Assembly consists of a long bar—(1) in left photo—to which are welded two short curved-end lengths (2). These fit into square slots (3) that are cut in the plate and spaced apart sufficiently to permit a truck fork to pass between.

To hold the horizontal section of the lift far enough from the plate for the forks to pass beneath, a metal stop (4) is welded to each vertical leg approximately 1½ in. above the curved extension.

The plate holes into which lift hooks fit are centered with the plate sides, but not lengthwise, being closer to the end from which the plate is lifted (see right photo). Thus, the plate rides against the fork, preventing wobbling and tetering during transporting.—*H. F. Davis, Chief Engineer, Danahy-Faxon Stores, Inc., Buffalo.*

"Harnessed" Heater Handles Humidity

Just a shallow, galvanized sheet-iron pan of water, suspended below a ceiling-type unit-heater, has proved adequate for maintaining desirable humidity in the flour-storage warehouse of a large New England Bakery.

Summer humidities in the warehouse weren't troublesome. However, during winter months, when temperature was maintained by the unit heaters, the warehouse became too dry for satisfactory flour storage.

In any event, a system was improvised which uses hot air from the unit heaters to evaporate water and thus provide the necessary humidity.

Since the rate of evaporation depends on surface area, pans were fabricated shallow in depth (about 4 in.) and large in diameter (width about 6 ft.). They were suspended on angle-iron supports 12 in. below the heater (see photo).

Water supply may be controlled either manually or automatically. In the latter method, condensate from the steam coils of the heater may be piped to discharge into the pan. This source of water has one real advantage: Evaporation leaves no deposit of salts, normally to be expected from other plant water. However, automatic float-valve controls are advisable to prevent overflow of pans .

Simplest way is to fill pans from plant water supply, using manually controlled valves. Time cycle of evaporation is quickly established so that filling by hand can be done on schedule. Cleaning of the pans is necessary but once a year—any time after heaters are turned off at the end of the winter.—*FE Staff.*

BUILT FOR TODAY'S GREATER POWER NEEDS

THE IMPROVED Exide-Ironclad BATTERY

for battery-electric trucks of all types, sizes and makes

IT'S OUTSTANDING... in design, performance, length of life. Back of the improved Exide-Ironclad battery are years of progressive research-engineering that have developed a continuous flow of improvements. *Now comes another great advancement*...

A NEW and EXCLUSIVE FEATURE—the polyethylene insulating tube sealer. This and other major improvements combine to make Exide-Ironclad, *more than ever before*, YOUR BEST POWER BUY ... AT ANY PRICE.

BUILT TO GIVE YOU...

RAPID ACCURATE HANDLING... UNIFORM RATE OF HANDLING... HIGH AVAILABILITY... LOW OPERATING COSTS ... LOW MAINTENANCE COSTS... LOW DEPRECIATION COSTS... HIGH MANEUVERABILITY... SAFE HANDLING

BECAUSE OF...

IMPROVED POSITIVE PLATE CONSTRUCTION

... the long-life grids now contain SILVIUM—an alloy of silver, lead and other components—which make them highly corrosion resistant. Top conducting bar is heavier.

...with the New Polyethylene insulating tube sealer

An insulating sealer for the bottom of the tubes. Acid-proof, non-corroding plastic, it fits snugly into slotted tubes of positive plate, and reduces loss of active material. Even the small sediment deposit of the past is reduced 50%. Thus, more active material remains available, and the high battery capacity is sustained for longer working life.

PERMANIZED NEGATIVE PLATES

Improved processing, a result of Exide Quality Control assures uniform plates with higher electrical efficiency. These negatives, teamed with the improved positive plates, give you a well-balanced combination for hard service and long life.

NEW SEALING COMPOUND

Through the cooperative efforts of Exide Laboratories and the Franklin Institute, a new homogeneous compound was developed. It makes a permanent seal between the jar and cover, resisting shock without cracking in high or low temperatures.

SEAMLESS SHOCK-PROOF JAR

Made of high quality rubber. A scientifically selected combination of tensile strength and elongation provides a sturdy jar built for long life and heavy-duty service.

CORROSION RESISTANT TRAY GUARD

A plastic acid-resistant steel tray coating with high insulating quality and ability to withstand hard knocks.

NEW UNBREAKABLE PLASTIC VENT PLUGS

Made of unbreakable polyethylene. Can be quickly and easily removed to add water.

Types and sizes for storage battery applications in all heavy-duty services.

Write today for further information.

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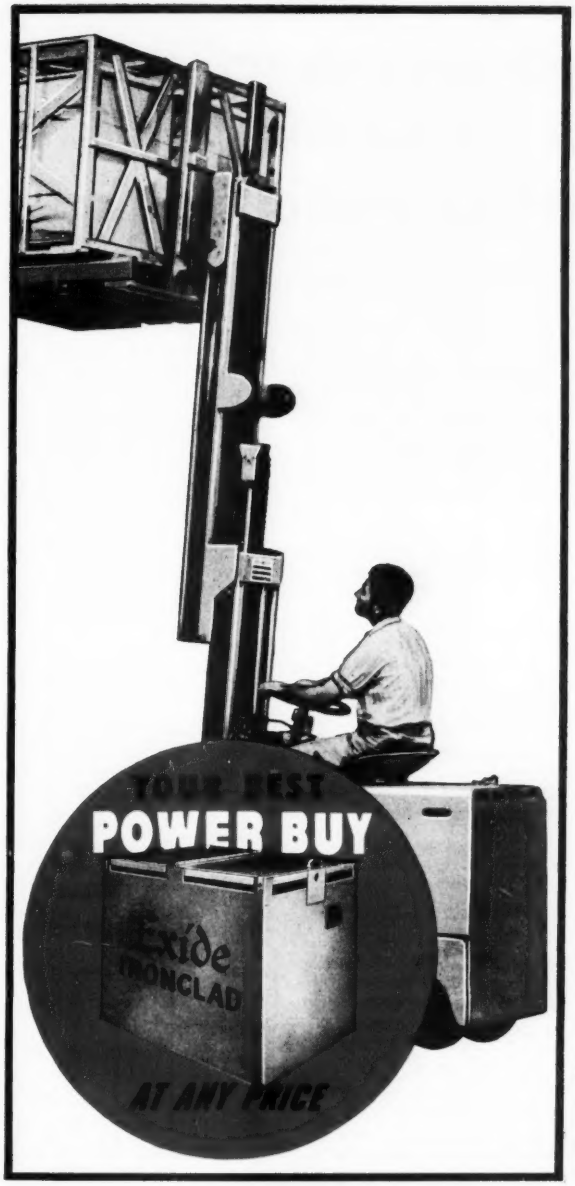
EXIDE-IRONCLAD and "PERMANIZED" *Reg. Trade-marks U. S. Pat. Off.* "SILVIUM" *T. M. Reg. applied for*



(Advertisement)

With This NEW Improvement Niagara "No-Frost Method" puts you a big step ahead in trouble-free, automatic refrigeration or freezing

Niagara "No-Frost Method" keeps frost and ice COMPLETELY OUT of your cooling, chilling, freezing or cold storage.

It uses Niagara No Frost Liquid Spray to keep frost and ice from ever forming. It gives you, automatically, refrigeration with no defrosting, and full capacity NEVER cut down by ice building up progressively on refrigeration coils.

Now, a NEW design No Frost Liquid concentrator, using a new principle, takes away moisture as fast as it is condensed by evaporating it at low temperature—not boiling it away at high temperature. It has 14 times the capacity of the old method per dollar of investment—one concentrator will handle a battery of high capacity spray coolers.

This gives you more refrigeration at lower cost; less machinery in less space. You operate at high suction pressure, saving power and wear and tear on compressors.

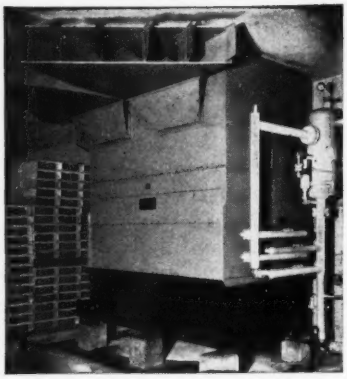
The extra capacity and lower cost both for equipment and operating makes this method advantageous for every type of refrigeration use—both for freezing and for moderate temperatures—for large "live" loads as in meat chilling or in fruit and vegetable pre-cooling—for rooms that are filled and emptied of product daily, such as milk rooms and terminal storage warehouses.

You get true trouble-free refrigeration . . . No brine . . . no salt solution . . . no dirt . . . no mess . . . It is entirely clean; you get rid of dirt and odors. You reduce both equipment and operating costs.

With Niagara "No-Frost Method" you easily keep constant temperature of products in your rooms, improve quality, get more production.

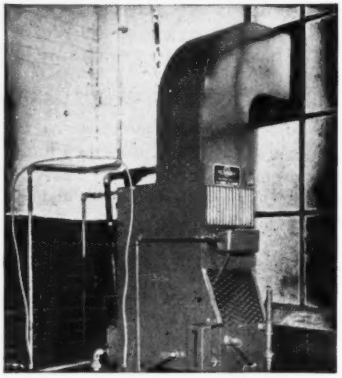
There are two series of concentrators: one, with evaporating capacity up to 6 gal. of water per hour, is economical for small freezing or hardening rooms, milk rooms, single room storage. The other, evaporating up to 36 gal. per hour, serves a battery of large coolers as in multiple floor cold storages, large chilling, freezing or pre-cooling plants.

For complete information write to the Niagara Blower Company, Dept. FI, 405 Lexington Avenue, New York 17, New York.



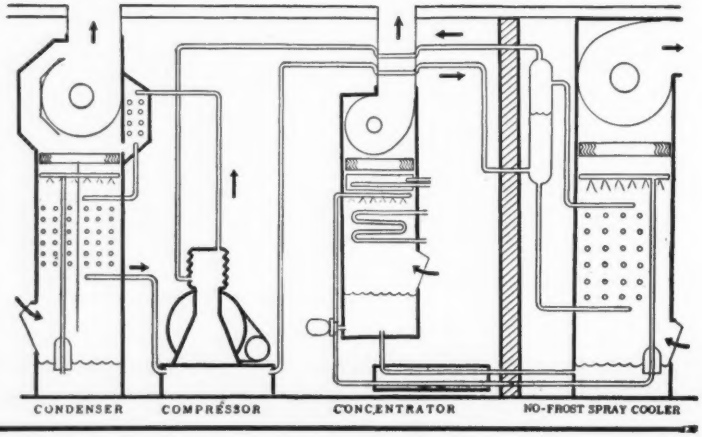
Niagara No Frost Spray Coolers
PATENTED

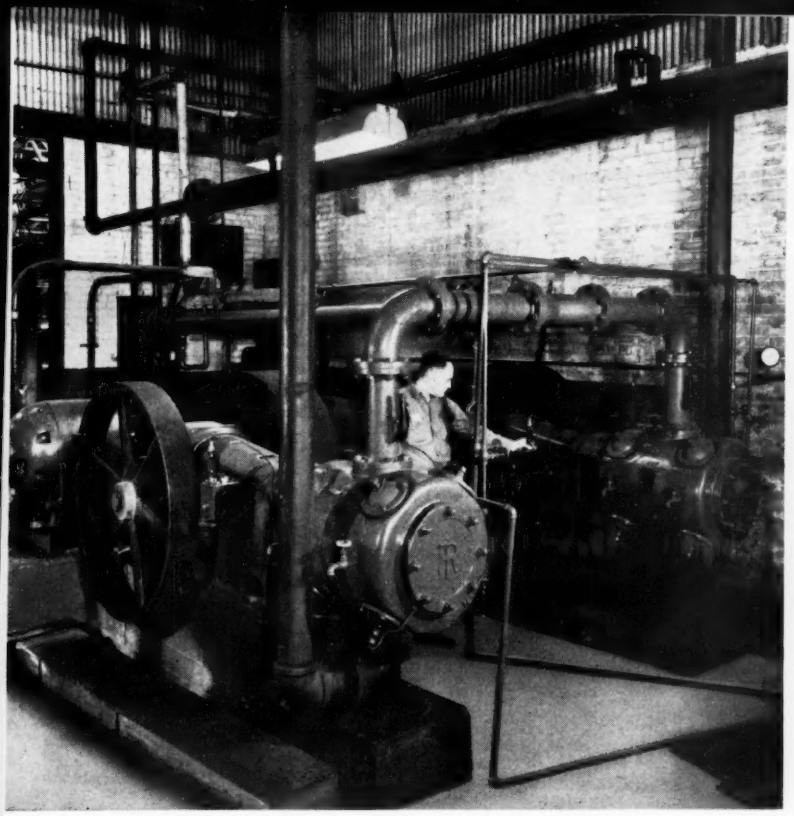
With the "No-Frost Method" you always get the full amount of refrigeration your compressor will deliver and for which you are now paying. If you need extra capacity, the Niagara "No-Frost Method" can help you get it with your present compressor.



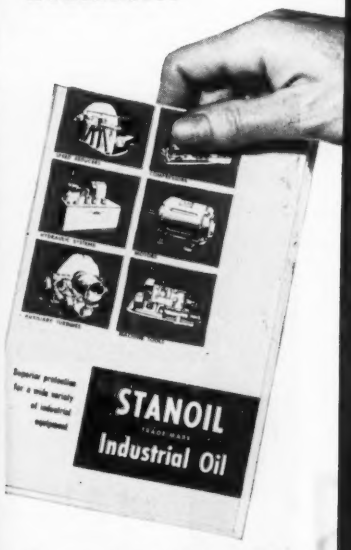
Niagara No Frost Concentrator
PATENTED

No salt solution . . . No brine . . . The Niagara "No-Frost Method" gives you a clean system, clean rooms, clean equipment.





Send for this booklet...



See what Stanoil offers you...

You'll find the means to significant savings in this booklet. It describes the important qualities of STANOIL Industrial Oil and the resultant benefits which have made this multi-purpose oil the choice of midwest manufacturers for a host of important lubricating jobs. Discover how STANOIL will give you superior protection through its unique combination of six outstanding characteristics, including high stability and effective rust prevention. Find how STANOIL can simplify stock, storage, and inventory in your plant by replacing special-purpose oils in hydraulic systems, speed reducers, air compressors, machine tools, electric motors, auxiliary turbines, and a wide variety of circulating, bath, and bearing systems. Ask the Standard Oil lubrication specialist from your nearby Standard Oil office for this booklet, or write: Standard Oil Company (Indiana), 910 S. Michigan Ave., Chicago.

Compressors give carbon the air

• When carbon formed on the valves of these air compressors and the oil in the crankcases had to be changed frequently, operators of this Midwest plant called in a Standard Oil lubrication specialist. He recommended STANOIL Industrial Oil, a multi-purpose oil having a low carbon-forming tendency and containing effective oxidation and corrosion inhibitors. With STANOIL, the compressors gave the air to carbon troubles and have breezed through four years of hard operation without difficulty. Over the oil previously used, STANOIL has given four times longer service in the crankcases. These results . . . similar to the results you may expect . . . have led to the use of STANOIL in other equipment in this plant.

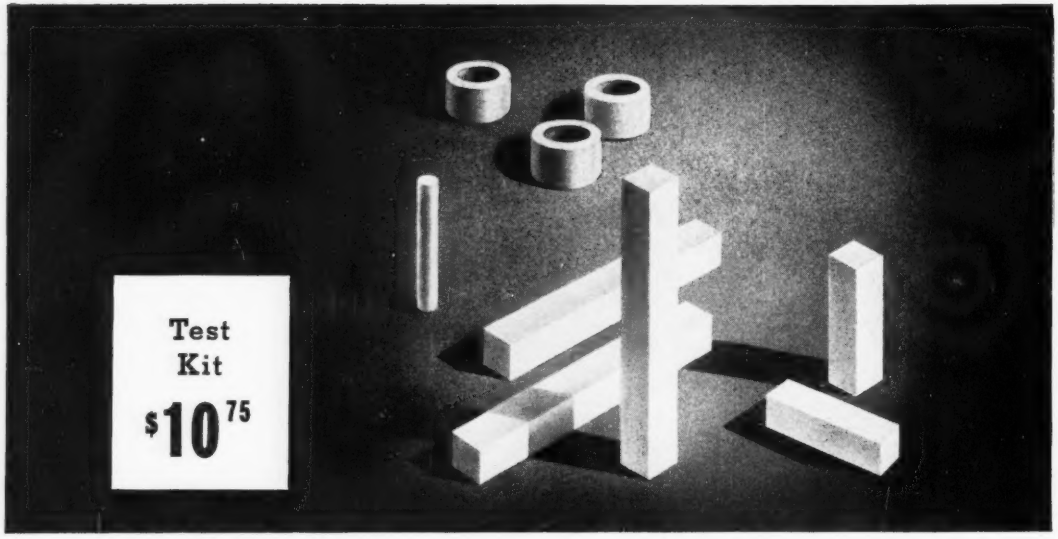
STANOIL
TRADE MARK
Industrial Oil

Find how this multi-purpose oil can benefit you by discussing it with a Standard lubrication specialist. You can contact him by phoning your local Standard Oil office.

Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY STANDARD *(Indiana)*

Now, TEST NEW CARBOLOY *for corrosion,*



FOR METALLURGISTS! ENGINEERS! PRODUCT DESIGNERS! Lab-test kit of new Grade 608 Carboloy Chrome Carbide. Includes: three bars ¼" square x 2"; two bars ¼" square x 1"; three bushings 5/16" long, ½" O.D., 5/16" I.D.; one rod ⅛" diameter x 1" long. (Bulletin WR-104 included.) Samples adequate for wide range of metallurgical and chemical tests. Additional information relative to your application free, on request, from Carboloy engineers. Order kit for your preliminary testing today. Check new Grade 608 Chrome Carbide against your requirements *now*. See properties and test results below.

Properties and test results of Grade 608

THE OUTSTANDING properties of Grade 608 Cemented Chrome Carbide promise to open new cost-saving applications throughout industry. You may wish to expedite your initial test appraisals by starting with the above test kit now, pending larger quantities or supplies as production facilities expand.

Physical Properties
(Grade 608)

Composition: 83% $CR_3 C_2$
2% WC
15% Ni

Hardness (Nominal): 88 Rockwell "A"

Density (Nominal): 7.0 gms/cm³ (Slightly lighter than S.A.E. 1095 steel)

Transverse Rupture Strength: 100,000 P.S.I.

Coefficient of Thermal Expansion: 6.4 in range of 70° —1292°F.

Relative Abrasive Resistance: Dry Al Oxide—58.0

Test Results

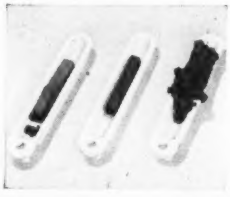
Salt spray. After subjection to a 30% salt spray for 750 hours, Grade 608 still retained its metallic lustre.

Sulphuric acid. With sulphuric acid as the corrosive agent, Grade 608 showed about 30 times the resistance of 18-8 stainless steel, and 3 times the resistance of tungsten carbides.

Nitric acid. Using nitric acid, the resistance to corrosion was approximately 8 times that of other carbides and twice that of stainless steel.

Steam erosion. Tests indicate a resistance to steam erosion approximately 60 times that of conventional carbides.

Lactic or citric acid. Grade 608 was practically inert under all conditions when exposed to lactic or citric acid.



OXIDATION RESISTANCE. (Left to right.) Samples of 18-8 stainless steel, Grade 608 Chrome Carbide and tungsten carbide after exposure in air at 1850°F. for 24 hours. All were originally identical in shape and size. Grade 608 Chrome Carbide appears to be virtually completely resistant to oxidation at all temperatures up to 1000°C. (1832°F.). Samples subjected to 1850°F. were only slightly discolored.

CEMENTED CHROME CARBIDE *abrasion, erosion*

New Grade 608 Carboloy Cemented Chrome Carbide, first of the new Series 600 Chrome Carbides, with chromium as principal ingredient, gives high resistance to corrosion or erosion, combined with good abrasion resistance. Opens new areas for carbide benefits, new product design. First sample test quantities now available; production quantities soon. For properties, sample kit, suggested uses of this great new Carboloy created-metal, see below.

Now available for your product designers, process engineers and metallurgists . . . sample test quantities of Carboloy Grade 608 Cemented Chrome Carbide, first in an entirely new series of metallic carbides.

Series 600 Chrome Carbides contain chromium as the principal ingredient. They are cobalt-free and practically tungsten-free. They feature high resistance to corrosion or erosion, combined with good abrasion resistance.

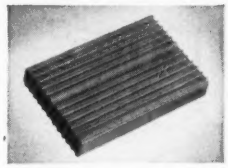
Field tests already point up exciting new areas where Series 600 will bring new cuts in costs, new highs in performance. Undoubtedly, *your* field, *your* product may benefit, too. Use sample kit to start your preliminary metallurgical and chemical tests of Grade 608 today.

An expansion of carbides

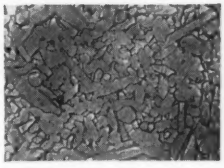
Series 600 Chrome Carbides are light in weight, completely nonmagnetic and have a coefficient of thermal expansion about the same as that of steel. They are as machineable and as hard as tungsten carbides. They are stable and strong.

Fabricating and finishing techniques are the same as tungsten carbides. A flash plating of nickel makes Chrome Carbide blanks (as sintered or as ground) readily brazable with conventional brazing materials.

Series 600 may overlap a few tungsten carbide applications. But because of their unusual wear-proofing properties, their wear- and corrosion-resistance, look to Chrome Carbides for famous carbide benefits in many new areas of industrial and product applications. Here may be new opportunities for you, starting with Grade 608.



GAGE ANVILS currently being made of Grade 608 Chrome Carbide. In gage blocks, ring gages, plug gages and gage anvils, Chrome Carbide has already shown an outstanding ability to resist corrosion and abrasion. Since its coefficient of thermal expansion is about the same as that of steel, readings are not affected by temperature variations.



MICROSTRUCTURE of Carboloy Grade 608 Chrome Carbide shows appearance unlike any other metal. Note, particularly, the uniformity and interlocking character of the grain structure. Chrome Carbide is lighter in weight than tungsten carbide; facilitates handling and use of solid carbide. It will pay to start your laboratory tests on Chrome Carbides now.

WHERE CAN YOU USE GRADE 608 CHROME CARBIDE?

Field tests indicate new Series 600 Chrome Carbides offer unusually high resistance to corrosion or erosion combined with good abrasion resistance. For example, the following applications are suggested for Grade 608. Where else can you use Grade 608 Chrome Carbide?

Sheer blades for molten glass

Core pins for baking ceramic parts

Fishing rod guides

Centrifuge nozzles, separating equipment

Bearings where corrosives are present

Textile guides

Nozzles and valves: soaps, fats, oils, foods, chemicals, petroleum products, pharmaceuticals, fruit juices

Valve and core pins, die casting

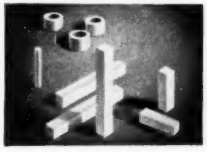
Punches for movie film

For many applications where stainless steel is not sufficiently abrasion-resistant

CARBOLOY
DEPARTMENT OF GENERAL ELECTRIC COMPANY
Detroit 32, Michigan

"Carboloy" is the trademark for the products of Carboloy Department of General Electric Company

Use Coupon *to order sample kit today*



CARBOLOY Department of General Electric Company
11201 East 8 Mile Street, Detroit 32, Michigan

Please send ( ) sample test kits of Grade 608 Carboloy Cemented Chrome Carbide at special price of $10.75 each. (Technical Bulletin included.)

Enclosed is ☐ Check ☐ Money Order ☐ Purchase Order for $_____

☐ Please invoice us.

☐ Please send Technical Bulletin WR-104 only.

Send to _____ Title _____

Name of Company _____

Address _____ City & Zone _____ State _____

At Your Service

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MORE THAN 80 YEARS OF CONTINUOUS SERVICE AND PROGRESS

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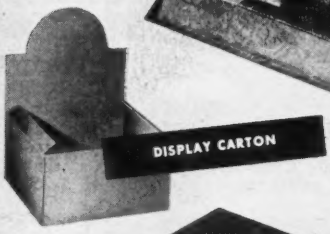
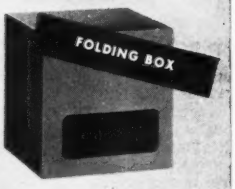
Expendable Fibre Pallets





PAPERBOARDS
Corrugating Material—Liner Boards—Folding and Set-Up Boxboards—Can, Tube and Cap Stock—Beer Case Partitions. Mills at:
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Toma, Iowa
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Quincy Container Division, Quincy, Illinois
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FOLDING AND SET-UP BOXES
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MODERN PRODUCTS FOR BETTER PACKAGING AND SHIPPING — *and better selling!*

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On a really tough hauling job, a truck's either got it, or it hasn't.

You either make money or you lose it. Only the *best* truck engineered for the job is a bargain for the operator.

That's why you see so many Internationals on tough jobs. That's why you'll be money ahead to see your International Truck Dealer or Branch and get the *best* truck engineered for your job. Why not make it *soon?*

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"Standard of the Highway"

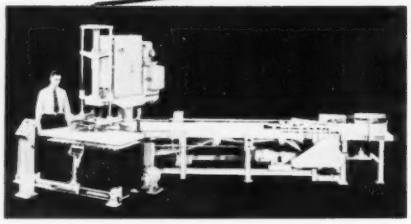
Model L-160, 142 inch wheelbase, insulated van body, 14,000 lbs. GVW.

When looking for lower cost in Food Packing...

CHECK WITH BARNES

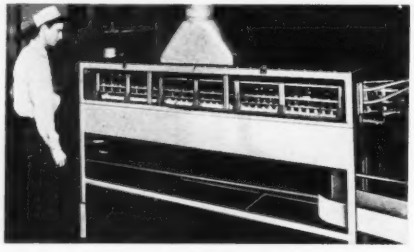
The products and installations we have made for the food industry are many and varied. However, each has one important feature in common . . . it has helped a food packer do a better job at less cost. These products and installations have resulted from our work in collaboration with food packers on specific problems. If you have similar or other problems in your plant it will pay you to talk to a Barnes' process engineer. There is no obligation for this service.

Over 500 Cans Unloaded per Minute

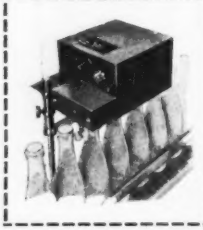


This unloader accommodates both rectangular and round cans. It is provided with a special rotary can unscrambler and a long conveyor to accommodate hand casing of cans containing whole hams. It unloads up to 600 cans per minute depending upon size and shape of cans.

Production Jar Washer



This is one of our newest items for the glass packer. Jars, prior to entering the washer, are inverted and enter the washer with open end down. A fine spray of hot water under high pressure is applied to both inside and outside of jars as they pass through the enclosed washer.



Electronic Detector

This efficient unit detects missing closures. It has full automatic operation, is single, fast and dependable. It has a wide range of application, prevents loss of product and minimizes line down time.

Other BARNES Processing Equipment

Automatic Retort Basket Loaders and Unloaders
Packaged Can Unloaders
Glass Handling Machines
Special Conveyors
Tray Loader
Pallet Unloader
Carton Uncaser
Double Seamer

FREE ADDITIONAL DATA on these and other time and money savers for the food packer will be sent upon request. Write today. Ask for bulletin E852

W. F. and JOHN BARNES

PROCESS EQUIPMENT DIVISION 329 SOUTH WATER STREET, ROCKFORD, ILLINOIS

(*Advertisement*)

Aseptic Canning Captures "Touch" of a French Chef

Now, that fresh natural whole milk is being vacuum packed in cans, other milk base products will soon be available. This process insures that the delicate fresh flavor is retained as prepared by any famous chef. Andersen's Split Pea Soup, (although not a milk base soup) is an excellent example of how a product can be canned without impairing the savory goodness of a famous recipe. As Mr. Andersen said: "We picked the Martin System because in our opinion, it is the only method that retains the natural flavor and color of the all-vegetable split pea soup, *on which our reputation is based.*"

After unsuccessfully trying to can the soup and retain flavor with conventional canning methods for a period of ten years, Mr. Andersen found that the Martin Aseptic Canning System was the answer!

Retains Consistency While Eliminating Exhausting, Retorting and Cooling

The Martin System is compact, economical to operate and does away with conventional "in-the-can" processing. To the packer of some frozen products, it can eliminate the hazards and great expense of distribution, of a highly perishable product.

Short Time High Temperature Arrests Changes in the Original Flavor, Color and Nutritive Factors

Canning in the Martin Aseptic Canning System retains the identity of the original product that is protected by short-time high-temperature sterilization. Orange Juice canned by this method will retain its original flavor after several months of storage at normal refrigeration temperatures.

The Martin Aseptic Canning System is particularly advantageous in canning heat-sensitive products and products having poor heat transfer properties.

A handy slide rule for computing time and temperature requirements in aseptic canning is available upon request. Write to the W. F. and John Barnes Company, Process Equipment Division, 301 South Water Street, Rockford, Illinois.

Votator margarine manufacturing apparatus using Howell Motors installed at Durkee Famous Foods, Berkeley, California.

85% of U.S. margarine produced in Votator apparatus powered by Howell Motors

TWO AND a quarter tons of margarine per hour! Continuous processing from emulsion to print at this remarkable rate is the reason for the widespread use of Votator margarine processing apparatus, product of The Girdler Corporation, Louisville, Kentucky.

And because uninterrupted production is vitally important to the effectiveness of continuous processing equipment, The Girdler Corporation uses precision-built Howell Motors on its Votator apparatus.

The unit shown above is in operation at Durkee Famous Foods, Berkeley, California. Four Howell Motors, ranging in size from ¼ to 25 H.P., provide the dependable power needed for the main and "B" unit drives and two pumps.

Other leading manufacturers of food-processing equipment assure customer satisfaction by installing Howell Motors on the machines they build. They know from experience Howell Motors meet the same high standards of design, materials and workmanship, give the same outstanding performance with minimum maintenance as their own machines.

You, too, can benefit from the rugged durability, precision construction, even the trim, good looks of standard or special Howell Motors.

For technical assistance, write direct to our factory explaining your needs or problems. Or call the Howell representative in your city today.

HOWELL Red Band MOTORS

HOWELL MOTORS

Howell Electric Motors Co., Howell, Mich.

Precision-built industrial motors since 1915

DON'T BE SATISFIED WITH HALF-WAY MEASURES...

insist on Walseal® products and be certain

– the FACTORY INSERTED Ring insures FULL PENETRATION of the Silver Alloy . . . a perfect joint

Today, contractors . . . builders . . . architects are using brazed connections, in ever increasing numbers on their brass and copper pipe runs. However, they must be certain that the correct brazing alloy is used; that the joint has penetration of alloy up the shoulder of the fitting.

That's why more and more are turning to Silbraz® joints made with Walseal valves, fittings and flanges which assure the proper amount of alloy with no waste. They know that the finished joint not only will withstand hydrostatic pressure, but it will also withstand terrific impact and vibration – in fact, no correctly made Silbraz joint has ever been known to creep or pull apart under any pressure, shock, vibration or temperature which the pipe itself can withstand.

Furthermore, it is a relatively simple operation to make a Silbraz joint – no heavy scaffolding need be erected . . . just cut the pipe, flux, assemble, then braze, following the technique recommended by the Walworth Company. A silver brazing alloy – FACTORY INSERTED – in each port flows out when heated with the oxyacetylene torch, making a joint that is stronger than the pipe itself . . . a one-hand operation, with the mechanic out of the path of the deflected heat – at all times.

For full information about Silbraz joints made with Walseal products, write for Circular.

WALWORTH

valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

SEE OUR CATALOG IN SWEET'S

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Food Sales increase 15%* when ZEST® is added!

*Test reveals *regular* cafeteria customers bought *15% more food* when ZEST Monosodium Glutamate was used!

It's fresh, natural flavor that sells food. Tests prove it. You have always known it. Now you can sell more food than ever before by guarding the flavor appeal of your foods with ZEST . . . the miracle seasoning that ends gradual "flavor fading" in processed foods. Alert food processors everywhere are discovering the advantages of using ZEST in a wide range of canned and frozen foods.

See how Staley's Monosodium Glutamate—*by magnifying natural flavor*—can sell more canned or frozen foods for you!

ZEST is Staley's 99+% pure, instantly soluble Monosodium Glutamate. It brings out every bit of the natural food flavor appeal . . . yet adds no flavor, no aroma, no color of its own. You can magnify the flavor of meats, vegetables, seafood, chilies, stews, chowders, gravies and sauces. Simple to use, ZEST may be automatically added with your present equipment during processing . . . without any change in your formulas.

Improve the flavor of your processed foods . . . increase sales and profits as many leading food processors are now doing. Get the full flavor complete story of ZEST in processed foods!

Zest®

Staley's 99+% Pure Monosodium Glutamate

A. E. STALEY MFG. CO.—Decatur, Ill., U.S.A.

STALEY

Staley PRODUCTS

Research Pioneers in Products from
CORN and SOY BEANS

WHAT *Life-Lines* REALLY DELIVER IS MORE SERVICE...LESS SERVICING

The time to stop explosions is before they start

And here's the equipment to do it

Dual Label Explosion-Proof Motor

In any location where Class II, Group G, or Class I, Group D explosive materials present a hazard, you can operate this Life-Line explosion-proof motor safely. It's underwriter approved for *both* explosive dusts and explosive vapors.

And the Life-Line offers extra protection against outages. Heavy steel construction provides greatest protection against physical damage. Pre-lubricated bearings need no further lubrication . . . eliminate outages due to faulty greasing. Superior winding techniques and insulation reduce electrical failures. Together they add up to longer life . . . less servicing.

For Hazardous Locations—Life-Linestarters®

Specially reinforced, cast enclosures with wide flame seals are available in Class I, Group D. Class II, Groups E, F, G are also available. Bi-metal overload relay protection and AB Circuit Breakers cut down time. In case of fault, no need to remove cover to reset breaker or overload relay mechanism. Service is restored immediately.

Simple design, single operation mean fewer operating parts to foul. Seesaw action of clapper prevents accidental operation. Kickout spring assures positive opening. Exclusive "De-ion®" arc quenching plus silver-to-silver contacts eliminates contact filing. Compare any other starter and see why Life-Lines offer more service with less servicing.

Together Life-Line motors and starters offer the food industry a new concept in performance. You get more service on the job . . . less down time and servicing. Ask your Westinghouse representative for complete details on both, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21701

YOU CAN BE SURE...IF IT'S
Westinghouse
Life-Line
MOTORS and CONTROLS

BACK IN THE 1880's

WHEN THE EIFFEL TOWER WAS BUILT

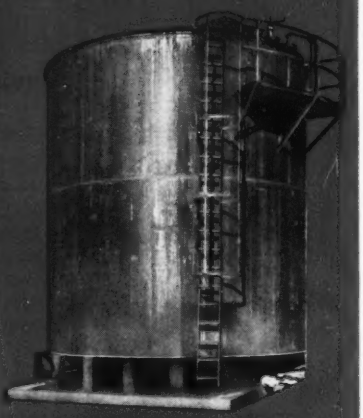
Koven

WAS MAKING INDIVIDUALIZED FOOD EQUIPMENT

All of France waited breathlessly to view Gustav Eiffel's 1000 foot tower—the Empire State Building of its time. But even before that historic event—KOVEN skill was at work developing new industrial techniques.

Today—KOVEN Individualized Equipment—the result of over 70 years of know-how helps to achieve production peaks and reduce costs for key plants throughout the nation because it is built to fit the specific requirements of each operation. Call or write for a consultation—no obligation.

Complete modern facilities including X-ray inspection and stress relieving which insure quality control. KOVEN equipment in all commercial metals and alloys include: pressure vessels, extractors, mixers, stills, condensers, kettles, tanks, chutes, containers, stacks, coils. Fabrication to A.S.M.E. Code par. U-68 and U-69 a specialty.



Bulk storage tank made of steel

Stainless steel concentrator

PLANTS:

Jersey City, N. J.

L. O. KOVEN & BRO., INC., 154 Ogden Ave., Jersey City 7, N. J.

KOVEN FOR INDIVIDUALIZED EQUIPMENT SINCE 1881

The Modern Food Container!

. . . is finding wide success as an individual coffee bag due to its many fine features

VISKON IS ECONOMICAL!
Gives top performance where a "breather" type package is required—at little cost.

VISKON IS HEAT-SEALABLE!
Generally, VISKON seals at between 350° and 500°F, corresponding with dwell time and jaw pressure.

VISKON IS STRONG, DURABLE!
Holds its shape, yet is soft and flexible. Has exceptionally high *wet* strength.

VISKON IS TASTELESS!
It's non-toxic, completely sanitary for use as a food container. Lint-free and non-raveling.

VISKON® nonwoven fabrics
—another product to fit today's needs by
THE VISKING CORPORATION
NORTH LITTLE ROCK, ARKANSAS

VISKON nonwoven fabrics offer a new product for packaging where porosity, product breathing, absorption, diffusion, infusion and *wet strength* are needed. **VISKON** opens up new and better ways to present your product to the consumer. Already **VISKON** has proven a success in coffee packaging. **VISKON** is suitable for packaging of tea, dried food, spices, etc.

VISKON is made of rayon and cotton fibers bonded with cellulose . . . can be safely used in connection with foods. It is non-toxic, tasteless, odor-free, lintless and completely sanitary.

VISKON is available in mill rolls, tapes or sheets—in a wide variety of weights and grades of either cotton or rayon fabric. Investigate **VISKON** today for your food packaging problems. Mail handy coupon below for additional information and samples . . . do it today!

Please send more information about VISKON for use as a product container.

THE VISKING CORPORATION, Dept. FA
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Name .....
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Address .....
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 For more information, use post card on last page.

KEEP POWDERED PRODUCTS FROM SIFTING

...with tailor-made Riegel papers

A few things RIEGEL can do for you . . .

- Keep products dry
- Keep products moist
- Retard rancidity
- Seal with heat or glue
- Provide wet strength
- Stop grease penetration
- Retain aromas, flavors
- Resist extreme cold
- Reduce breakage
- Prevent sifting
- Protect from light
- Resist alkalis
- Resist corrosion
- Boost machine efficiency

MANY UNUSUAL PROBLEMS are created by powdered or granulated products that may sift through the seams of a package . . . problems Riegel has solved for many items such as dessert powder, prepared flour, sugar, drugs and chemicals. What is right for one product is seldom right for another. In one case the answer may be a standard waxed glassine . . . in another it may be a special triplex lamination. Whatever the answer, Riegel can usually tailor-make the right paper . . . quickly, efficiently, economically. Just tell us what you want paper to do for you.

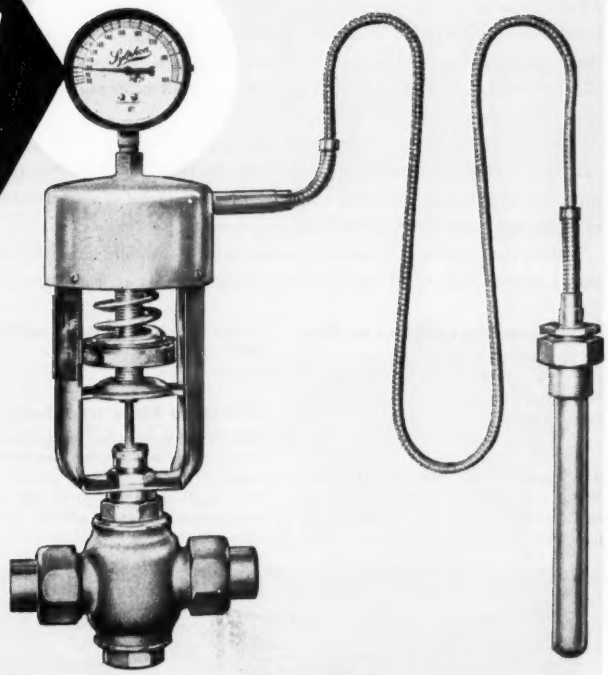
Write to *Riegel Paper Corporation, P.O. Box 170, Grand Central Station, New York 17, N. Y.*

Riegel FUNCTIONAL PAPERS FOR PROTECTIVE PACKAGING

- WRITE FOR SAMPLE BOOK

LOOK!

for simpler, more accurate temperature control



SYLPHON REGULATOR 999-T
WITH DIAL-INDICATING THERMOMETER

WITH THIS Sylphon Regulator 999-T you can control processing operations better. For the dial-indicating thermometer tells you at a glance the temperature being maintained at the regulator bulb location. It eliminates the need for a separate thermometer adjacent to the bulb. And it helps make regulator adjustments easier, better, more accurate.

More advantages! 999-T has a stainless steel frame for minimum heat conduction from valve to regulator head. Its 2-ply Sylphon bellows provides added power. Less height and weight make it more compact. Self-operating—requires no auxiliary power source. Simply and sturdily constructed—ideal as standard equipment.

For added assurance of uniform processing conditions . . . for better performing equipment . . . for prevention of wasteful overheating . . . you can count on 999-T. Ideal for all industrial processing temperature control. Particularly suited for storage water heaters . . . metal plating tanks . . . bottle washers . . . treaters . . . slashers. For complete details, write for Catalog PG-A.

Temperature Controls • Bellows Devices • Bellows Assemblies

FULTON SYLPHON
DIVISION

FIRST WITH BELLOWS

ROBERTSHAW-FULTON CONTROLS CO., KNOXVILLE 4, TENN.

Canadian Representatives, Darling Brothers, Montreal

HOW MUCH DO FILTER

Have you ever thoroughly investigated both the direct and indirect cost of filter cloths in your plant? If not, the chances are you will be surprised to find that annual cloth replacement and maintenance cost alone runs from $1.00 to $4.00 per square foot of press area per year, depending on the utilization of your press, the product and the type of fabric you use.

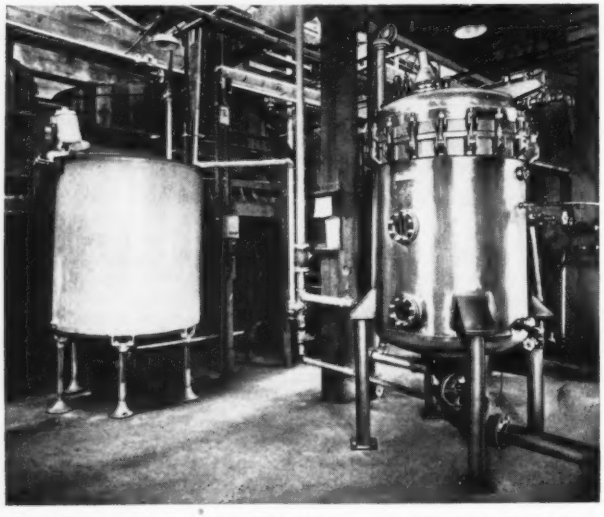
Other costs associated with use of cloths, such as the labor for scraping, handling, washing; breaking and redressing the press; and purchasing time expended in obtaining the cloth you need when you need it will probably be even greater, even if not as easily pinned down.

Here then are three immediate reasons why you should consider switching to modern high-speed Stainless Steel Niagara pressure leaf filters:

1. Niagara filters require no filter cloths. Accurate case histories in our files show that some plants amortize their Niagara filters in a few years on this saving alone.

2. Niagara filters require less labor. When you eliminate filter cloths, you eliminate the back-breaking and costly labor that goes with them. With Niagaras you get a quick, easy, clean operation that takes only a few minutes for one man between cycles.

3. Niagara filters work harder for you. Reduced downtime means more production time and higher production at your filter station. The filter works for you more hours per day—gives you many more gallons throughput with less installed filter area.



COST OF THIS NIAGARA "Auto-Sluice" filter, which removes impurities from weak pectin liquor, was amortized by user in less than one year, out of savings over previous filtration methods.

By switching to Niagaras, many press users have realized over-all savings that amortize the cost of the new filters in months, as well as unsanitary conditions.

Entirely aside from savings, here are eight sound reasons for installing Niagara filters:

1. No cloth pollution. Since there are no cloths to handle, the danger of contamination from handling is completely eliminated.

2. Sparkling filtrate clarity. Positive removal of solids to practically any degree of clarity you desire—one filtration is usually sufficient to obtain 0-0 bacteria count.

3. No leakage. Fully enclosed, pressure-tight construction eliminates drippage and loss of product at the filter station.

4. Stainless steel construction. Stainless steel at all liquid contact points (also available in nickel, monel, or the metal of your choice).

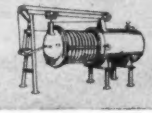
5. One-man operation and cleaning. Single or multiple units can be operated and cleaned easily by one man. The entire leaf battery is accessible for easy cleaning.

6. Higher flow rates on an equal area basis. Niagaras normally give flow rates 2 to 5 times greater than conventional cloth covered Filter Press.

7. Excellent cake-washing characteristics. Nearly true displacement washing is obtainable. This means minimum product loss in the filter cake.

8. Wide capacity range. Sizes range from 20 to 950 square feet of filter area, with average capacity of 10 to 425 GPM in one compact unit. (Even larger areas are available in the new horizontal filter shown at right on the opposite page.)

Niagara Filter CORPORATION

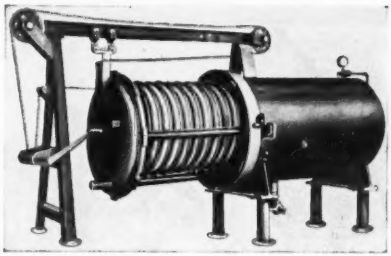


HORIZONTAL for non-aqueous liquids; high solids; cake recovery.

IN EUROPE—NIAGARA FILTERS EUROPE, 36 Leidsegracht, Amsterdam-C, Holland

CLOTHS COST YOU?

NEW NIAGARA STYLE H* FILTER
Low cleaning time . . . no cloth cost



This new Niagara filter answers the need for a filter which can quickly discharge large quantities of semi-dry cakes. A variation of the standard Niagara design, it still retains all the basic advantages of Niagara vertical pressure leaf filters.

A retractable carriage permits all leaves to be withdrawn at once for rapid cleaning. One man can easily discharge as much as 150 cu. ft. of cake in a matter of minutes.

A new closure design, the Q/O*, (quick-opening) cover, permits faster, easier opening and closing than ever before in a filter of this size.

The Style H filter, available in sizes up to 1500 sq. ft., is ideal for filtration where high percentages of solids must be removed or where solids must be saved. It is also recommended for all standard liquid clarification where low headroom or other special reasons make its horizontal construction preferable to a vertical filter.

*Trade Mark Patent Applied For.

HOW THE NIAGARA FILTER WORKS

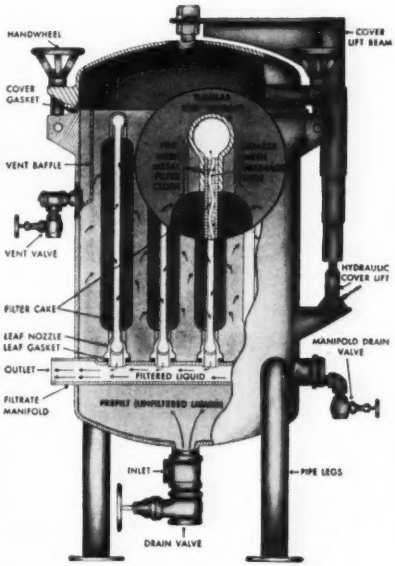
The leaves, which are the heart of the filter, consist of double-faced screen assemblies bounded by a tubular drainage frame leading to an outlet nozzle.

The unfiltered liquid with filteraid in suspension, is pumped into the closed pressure filter tank in which the leaves are placed. Liquid is forced through the fine-mesh screens, on which the filter cake is formed by the solids in the liquid.

Only the clear liquid reaches the inside of the leaves, flowing through the coarse center drainage wire to the tubular frames, and out through the leaf nozzles to the manifold.

When the batch has been completely filtered, or when the cake has nearly filled the space between the leaves, the filter is emptied and the filter cake is sluiced from the leaves with a hose or with automatic high-pressure sprays. Sluicing is done without removing any parts from the filter.

As a rule, the filter is ready to go to work again in 15 minutes to one hour, depending on its size.



THESE 5 SERVICES HELP MAKE HIGH-SPEED, LOW-COST FILTRATION A REALITY IN YOUR PLANT:

1. Nationwide field service. Niagara representatives in 24 cities know filtration and can give you facts.

2. Modern filtration laboratory determines your requirements accurately by test-filtering samples of your materials.

3. Pilot filter rental plan enables you to "preview" Niagara performance in your plant, at low cost.

4. Custom engineering. A single filter or a complete system, designed for your needs and built in materials of your choice.

5. Installation and start-up are supervised by Niagara factory engineers, always on call.

PILOT FILTER duplicates operation of large production models.

STANDARD VERTICAL —for clarification and "polishing".

"AUTO-SLUICE" for fully automatic cake sluicing.

Operating figures prove the economic soundness of replacing cloth-covered presses with Niagara filters. For details, write us today. Or mail the coupon for descriptive literature.

NIAGARA FILTER CORP., 3085 Main St., Buffalo 14, N. Y.

Please send: ☐ General literature; ☐ Data on horizontal filters; ☐ Data on pilot filter rental

Name_____

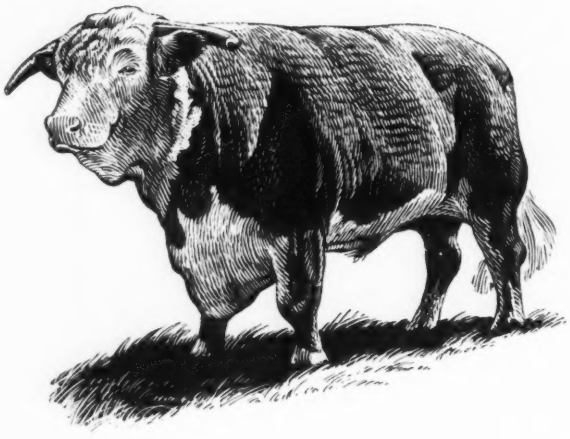
Title_____

Company_____

Address_____

City_____ Zone____ State____

SAFE REFRIGERATION
in the Food Industry



Holds 150,000 lbs. of meat at 35°F. with "FREON"-operated equipment

In the huge warehouse of the National Tea Company, Hopkins, Minnesota, over 75 tons of fresh meat, and 5 tons of smoked meat, represent the average 24-hour product load in storage rooms maintained at 45° to 35° F. Tons of other food products . . . produce, eggs, poultry, lard and baked goods are similarly stored in temperatures ranging down to −15° F. Refrigeration requirements throughout the warehouse are handled by a battery of 23 compressors charged with "Freon" refrigerants.

IMPORTANCE OF "FREON" REFRIGERANTS

"Freon" refrigerants are ideal for use in all branches of the food industry. They're safe . . . noncombustible, nonexplosive, virtually nontoxic. They are used in many types and sizes of equipment suitable for every refrigeration need in food freezing, processing and cold storage. Some are big central systems and others consist of multiple-unit installations. They conserve space . . . and insure dependable, low-cost refrigeration.

If you are planning a new plant . . . expansion of an old one or need additional equipment . . . be sure to get complete information about refrigeration machines that use "Freon" safe refrigerants. They help protect your investment. Call or write any leading manufacturer of equipment or address: E. I. du Pont de Nemours & Co. (Inc.), "Kinetic" Chemicals Division, Wilmington 98, Delaware.

DU PONT

REG. U.S. PAT. OFF.

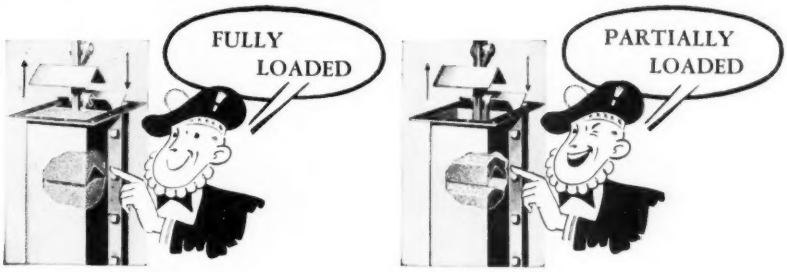
150th Anniversary

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

KINETIC

"FREON" SAFE REFRIGERANTS

"Freon" is Du Pont's registered trade-mark for its fluorinated hydrocarbon refrigerants.



Yes—BULK-FLO gives positive, gentle handling—fully or partially loaded

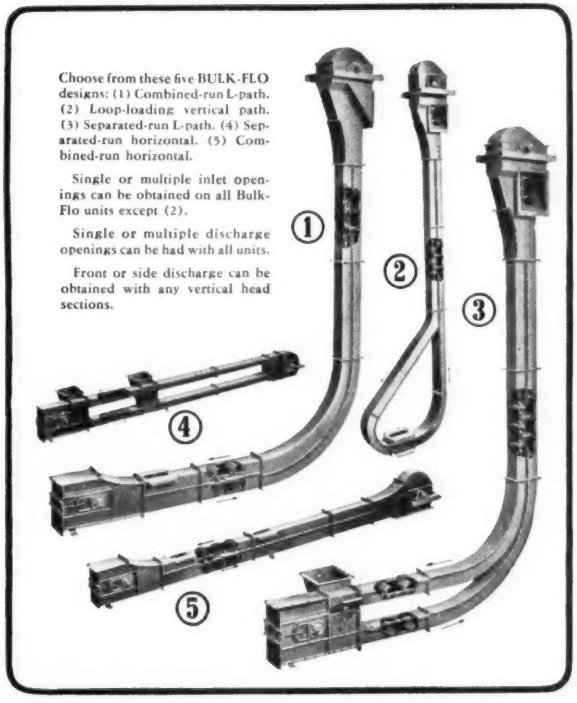
LINK-BELT's combined feeder-conveyor-elevator profitably handles hundreds of materials

12,663-R

YES, only BULK-FLO gives you all these advantages in a single unit...

1. *Positive movement* of material. Solid flights substantially cover area of casing—no avalanching on vertical or steeply inclined runs.
2. *Gentler handling.* Material is protected in individual "compartments" for minimum degradation.
3. *Self-clearing.* To permit alternate handling of different materials and to prevent contamination of batches.
4. *With constant speed,* capacity can be varied by regulating feed.
5. *No contamination* from lubrication.
6. *Chains and casings* can be metal-coated or made of alloy. Dust-tight. Can also be liquid- and vapor-tight.
7. *Horizontal, inclined, vertical* or a combination of these paths in a single unit—often requiring less units, in less space, at lower cost.

Ask your Link-Belt representative for further information. Or write for your copy of Book 2475.


Choose from these five BULK-FLO designs: (1) Combined-run L-path. (2) Loop-loading vertical path. (3) Separated-run L-path. (4) Separated-run horizontal. (5) Combined-run horizontal.
Single or multiple inlet openings can be obtained on all Bulk-Flo units except (2).
Single or multiple discharge openings can be had with all units.
Front or side discharge can be obtained with any vertical head sections.
1
2
3
4
5

LINK-BELT

BULK-FLO
FEEDERS - CONVEYORS - ELEVATORS

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4 Toronto 8, Springs (South Africa), Sydney (Australia). Offices in Principal Cities.

A-H-H! O-H-H!

VICTOR PHOSPHATES FOR LEAVENING

Earn Gratifying Expressions From Satisfied Customers

It's no overstatement that Victor is *headquarters* when it comes to special leavenings for manufacturers of prepared mixes, self-rising flours, and baking powders. That's simply the record.

For instance . . . Victor's V-90® is the only known *slow acting* monocalcium phosphate. It has greatly improved the baking performance of prepared mixes and self-rising flour and has stimulated an entire industry to an interesting sales growth. Victor V-90 has been responsible for the relatively new and rapid growth of the self-rising corn meal industry.

Victor pioneered in the development of special phosphates for commercial doughnut mixes. Today, Victor's *controlled rate of reaction* sodium acid pyrophosphates are accepted as the standard in the manufacture of doughnut mixes.

And again . . . in the baking industry, Victor's name has long been associated with leadership in leavening. Victor's Fine Tex, Victor Cream, and V-90 are standards for cake production,

U-M-M!

Bake-Aid for control of rope, and Regent® as the basic ingredient of the yeast foods and bread improvers.

Yes . . . Victor is headquarters for phosphates for leavening. Victor products help food manufacturers develop happy, satisfied customers. Do *you* have a leavening problem? It pays to consult with Victor. Victor Chemical Works, 141 W. Jackson Blvd., Chicago 4, Ill. In the West: A. R. Maas Division, 4570 Ardine St., South Gate, Calif.

VICTOR PHOSPHATES FOR LEAVENING

PRODUCT
MONOCALCIUM PHOSPHATE
Hydrated—$CaH_4(PO_4)_2 \cdot H_2O$
NOMENCLATURE
Monocalcium phosphate, monohydrate
Calcium acid phosphate, monohydrate
Calcium biphosphate, monohydrate
TRADE MARKS
Regent® 12XX
(U. S. Patent 2062064)
Vicream
Bake-Aid
Ajax
USES
Manufacture of baking powder, self-rising flour, pancake flour, prepared flour, phosphated plain flour
Mineral supplement
Bake-Aid is a "rope" preventive and bread improver
Vicream is for the manufacture of cookies and crackers
DESCRIPTION
Monocalcium phosphate is a brilliant white, free-flowing crystalline powder. Its purity complies with all Food and Drug Laws.
Granulation: Regent 12XX is a fine crystalline powder, all passing through a 12XX silk.
Vicream is a crystalline powder, somewhat finer than Regent 12XX
Ajax is a granular product which is specially sieved to eliminate extremely coarse and fine particles.
Typical analysis: Phosphorus 24.2%
Calcium 16.4%
pH (1% solution) 3.9

PRODUCT
MONOCALCIUM PHOSPHATE
Anhydrous—$CaH_4(PO_4)_2$ (heat-treated)
NOMENCLATURE
Monocalcium phosphate, anhydrous (heat-treated)
Calcium acid phosphate, anhydrous (heat-treated)
Calcium biphosphate, anhydrous (heat-treated)
TRADE MARK
V-90®
(U. S. Patents 2160700 and 2160232; Canadian Patents 388809 and 388810)
USES
Manufacture of self-rising flour, self-rising cornmeal, pancake flour, prepared flour, baking powder, phosphated plain flour, angel food cakes
As an ingredient of baking preparations (U. S. Patents 2160700-1 and 2160232-3)
DESCRIPTION
V-90 is a fine granulated, white, free-flowing powder, each particle of which has a thin, continuous coating of a relatively insoluble phosphate which delays solution when aqueous liquids are added
Typical analysis: Phosphorus 25.7%
Calcium 17.7%

PRODUCT
SODIUM ACID PYROPHOSPHATE
$Na_2H_2P_2O_7$
NOMENCLATURE
Sodium acid pyrophosphate
Acid sodium pyrophosphate
Disodium dihydrogen pyrophosphate
S.A.P.P.
TRADE MARKS
Victor Cream • Perfection • B. P. Pyro
USES
Baking acid for doughnut flours and prepared flours
Manufacture of commercial baking powders and baking creams
DESCRIPTION
Sodium acid pyrophosphate is a white powder whose purity meets the requirements of the Federal and State Pure Food Laws
Neutralizing value: Victor Cream 72%
Perfection 72%
B. P. Pyro 72%

V VERSATILE
VICTOR CHEMICALS

SALES OFFICES:
Kansas City, Mo. • Nashville, Tenn. • New York, N. Y. • South Gate, Calif., A. R. Maas Div.

PLANTS:
Chicago Heights, Ill. • Mt. Pleasant, Tenn. Morrisville, Pa. • Nashville, Tenn. • Silver Bow, Mont. • South Gate, Calif. • Victor, Fla.

A Star Quartet of Economical, Sales-Building Packages

for Your Products

Bemis Deltaseal®

—This long-time favorite has exclusive pull-cut-pour spout. Billboards your brand . . . and flat tops and bottoms help build excellent mass displays.

Bemis Deltaphane®

—If your trade prefers a window package, Bemis Deltaphane, with the "picture window," is your best bet. Your brand in crisp, bright colors on all four sides. Has the pull-cut-pour top, too.

Bemis Cellophane

—There's an increasing demand for the *show window* bags—Bemis Cellophane. Bemis' bright, eye-catching printing makes your brand shine like a headlight.

Bemis Flexi-Carton®

—Sturdy, gusseted bag, single-, 2- or 3-ply. A fine shelf package, with your brand printed on all sides. Closures: sewing, taping, stapling, pasting.

Here's another bonus for you . . . Bemis Deltaseal Packaging System closes all of these types of bags (except Flexi-Carton), so you can meet the varied demands of your trade. Deltaseal Packaging System is the most economical packaging operation for you . . . *proof on request.*

Bemis is also your best source for Burlap, Cotton, Multiwall, Paper and Waterproof Bags. Ask your Bemis Man for the complete story.

Bemis

THERE'S A BEMIS PLANT OR SALES OFFICE NEAR YOU—

Baltimore • Boise • Boston • Brooklyn • Buffalo • Charlotte • Chicago • Cleveland Denver • Detroit • East Pepperell, Mass. • Houston • Indianapolis • Kansas City Jacksonville, Fla. • Los Angeles • Louisville • Memphis • Minneapolis • Mobile New Orleans • New York City • Norfolk • Oklahoma City • Omaha • Peoria Philadelphia • Phoenix • Pittsburgh • St. Louis • Salina • Salt Lake City • Seattle San Francisco • Vancouver, Wash. • Wichita • Wilmington, Calif.

Quality YOU CAN SEE AT A GLANCE

• *Here is the sparkling-clean Tri-Clover 3-A Approved sweep ell. Its high-gloss finish, inside and out, and smooth, clean-cut appearance tell at a glance that highest quality materials and workmanship went into its fabrication.*

. . . *in ALL TRI-CLOVER Stainless Steel Sanitary Fittings*

the COMPLETE line:

Your assurance of quality and dependability is backed by over 30 years of specialized experience in the design and fabrication of the COMPLETE Tri-Clover line, which now includes:

- **3A Standard Sanitary Fittings and Valves (Stainless Steel and Tri-Alloy)**
- **Centrifugal Pumps—Sanitary and Industrial**
- **Stainless Steel Tubing and Pipe—All sizes and analyses**
- **All-Sanitary Magnetic Full-Flow Traps**
- **Complete line of SUPER SPEED Tools for installing and maintaining fittings, tubing and pipe lines**
- **Special Fabricating Facilities**

TO make sure that your liquid conveying lines are protected against unnecessary maintenance time and expense, and to insure continually high product quality, it will pay you to *look for the Clover* on TRI-CLOVER Sanitary Fittings, Valves, Pumps, Tubing and Specialties.

TRI-CLOVER stainless steel and Tri-Alloy products represent the very highest quality. Precision fabrication methods and workmanship responsible for this quality are both costly and time-consuming . . . but the excellent, long-term service obtained in actual installations prove beyond doubt these methods are well worth while.

TRI-CLOVER Sanitary Fittings, Valves, Pumps, Tubing and Specialties are available from stocks carried by leading jobbers all over the country. *See your nearest TRI-CLOVER Jobber for further details.*

S-252

Tri-Clover®
MACHINE CO.
Kenosha, Wisconsin

TRIALLOY AND STAINLESS STEEL SANITARY FITTINGS, VALVES, PUMPS, TUBING, SPECIALTIES

TRI-CLOVER

FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS

THE Complete LINE

"Our operating costs are low with Dodge trucks!"

. . . says **W. J. THOMPSON,** *transportation manager, Carnation Co., Los Angeles, California*

"We've used Dodge *'Job-Rated'* trucks for years, and Dodge engineering has certainly kept pace with our hauling needs," says Mr. Thompson. "Dodge trucks are sure *dependable*—and that's one of many reasons we are now operating a large number in our fleet.

"To deliver dairy products, our trucks have to fight traffic day in and day out. That Dodge short turning radius saves much time and effort for our drivers.

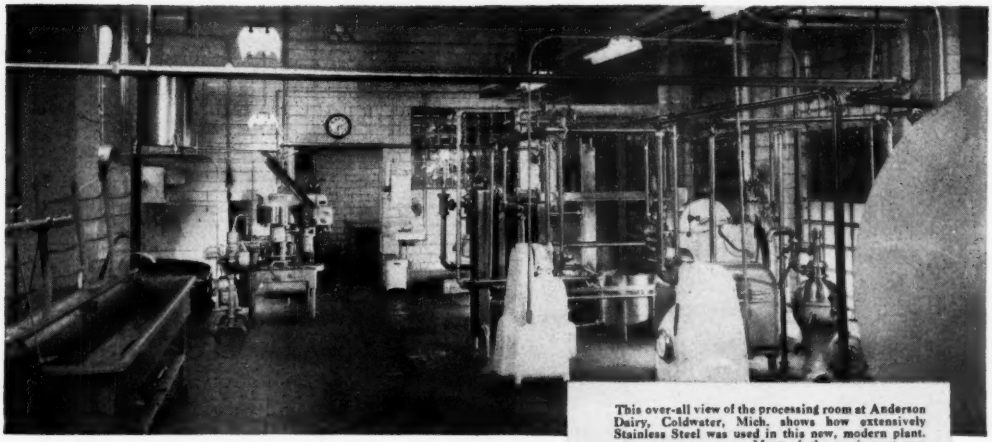
"We have also found that plenty of headroom, 'chair-height' seats and other Dodge cab features mean comfort to our drivers. And a comfortable driver is a more efficient driver. Most important, our operating costs are *low* with Dodge trucks!"

Frozen food men from coast to coast offer solid support to Mr. Thompson's enthusiastic statement. They readily agree that a money-saving truck is one that's engineered throughout to *fit the job.* And they agree that a Dodge *"Job-Rated"* truck is exactly that kind of truck!

Take a Dodge in the medium-tonnage range, for example. Its husky, high-compression power plant makes fuel and upkeep costs stay mighty low . . . thanks to such proved advantages as 4-ring pistons, chrome-plated top rings and exhaust valve seat inserts. Working loads in a Dodge is faster and easier, too, thanks to low ground-to-floor height.

Very likely you'll want to hear the *entire* story on economical Dodge *"Job-Rated"* trucks. There's a friendly fellow who's more than willing to tell it to you at a moment's notice. He's your Dodge dealer—a "nice guy to do business with."

DODGE "Job-Rated" TRUCKS



This over-all view of the processing room at Anderson Dairy, Coldwater, Mich. shows how extensively Stainless Steel was used in this new, modern plant. Most of the equipment was manufactured by The Creamery Package Mfg. Company, Chicago, Illinois.

When cleanups must be fast and frequent . . . you can't beat STAINLESS STEEL

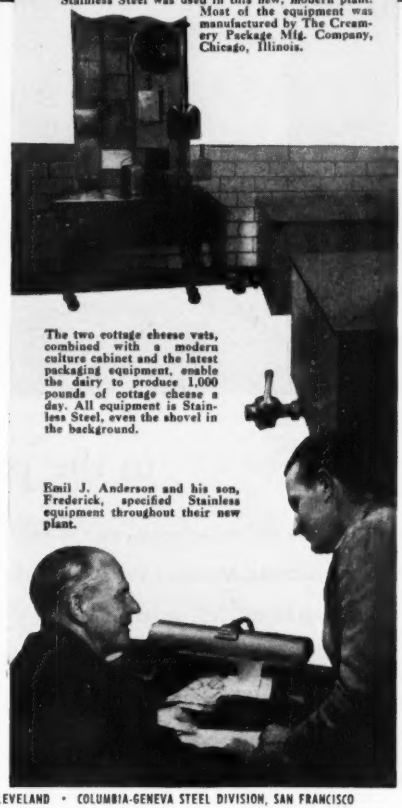
● There's good reason why milk plant operators have long led the parade toward almost 100% use of Stainless Steel in processing operations. No other material performs so well in maintaining the high sanitary requirements their product demands.

The modern, sparkling Anderson Dairy at Coldwater, Mich., is an excellent example. It's literally filled with Stainless Steel equipment—in the processing room, the receiving room and the cheese department.

The ease with which Stainless Steel can be cleaned and the way it stays clean are only two of its advantages in food processing equipment. It can't contaminate the product, and, in turn, the product can't harm Stainless Steel—even when you are handling acid foods.

Stainless Steel's resistance to corrosion and high temperature is important, too. Its dense, smooth, durable surface assures long life and freedom from maintenance and replacement.

A good rule of thumb is to specify Stainless Steel for every piece of equipment that comes in contact with the food you process. And for finest performance, make sure that your equipment manufacturer uses perfected, service-tested U·S·S Stainless Steel.



The two cottage cheese vats, combined with a modern culture cabinet and the latest packaging equipment, enable the dairy to produce 1,000 pounds of cottage cheese a day. All equipment is Stainless Steel, even the shovel in the background.

Emil J. Anderson and his son, Frederick, specified Stainless equipment throughout their new plant.

UNITED STATES STEEL COMPANY, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

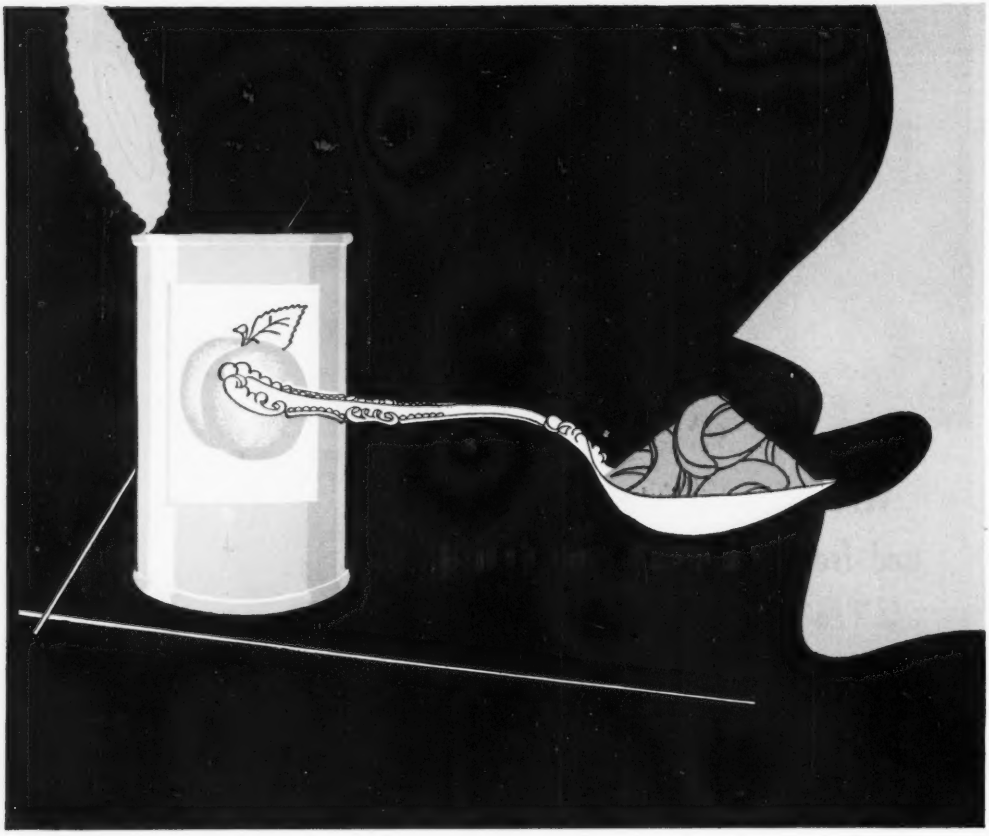
U·S·S STAINLESS STEEL

USS

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

2-1402

UNITED STATES STEEL



SUGAR in the pack means *flavor* at its peak!

Most canners use sugar*—and *only* sugar—in their packs.

Why? Because canners have learned that sugar-sweetened packs taste better, keep better, sell better.

Sugar provides 25 to 50% more sweetening power— is easier to use— requires no special handling or storage.

Use sugar to improve palatability, preserve natural color, and prevent material changes in the texture of cellular structure.

Experience has established its dependability. Consumers prefer its high quality.

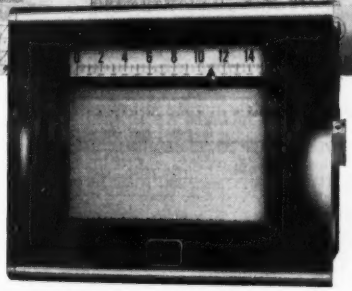
SUGAR INFORMATION INC.
NEW YORK 5, NEW YORK

*Sucrose

Instrument Makers CHECKED ✓

and chose the BRISTOL DYNAMASTER

Continuous-balancing electronic recorder



The instrument makers whose advertisements appear above know that their reputations depend upon the accuracy and reliability of their recorders. They select each component part with scrupulous care.

As the recording unit in their instruments, they all selected Bristol's Dynamaster. When you choose the Dynamaster for your own measuring needs you are assured of the same accurate, precise instrumentation demanded by these instrument makers.

THERE'S A DYNAMASTER FOR EVERY NEED

Available as a bridge or potentiometer, with strip or circular charts, Dynamasters can measure any variable that can be converted into changes in d-c voltage, d-c current, resistance, or capacitance.

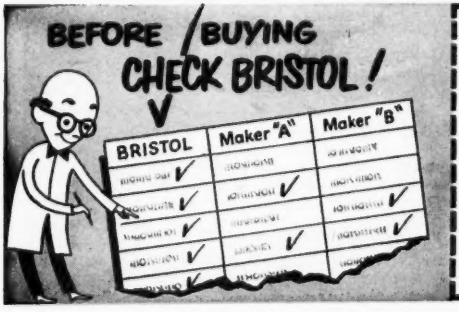
Dynamasters are providing accurate, trouble-free measurement and automatic control of such quantities as temperature, pressure, pH, speed, voltage, power, current, smoke density, strain, and resistance.

BRISTOL

FOR MORE INFORMATION *on the uses of this versatile recorder, use the coupon to get Catalog No. P1245.*

The dependable Guidepost of Industry

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS



THE BRISTOL COMPANY
115 Bristol Road
Waterbury 20, Conn.

Please send catalog giving details of Dynamaster performance to:

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

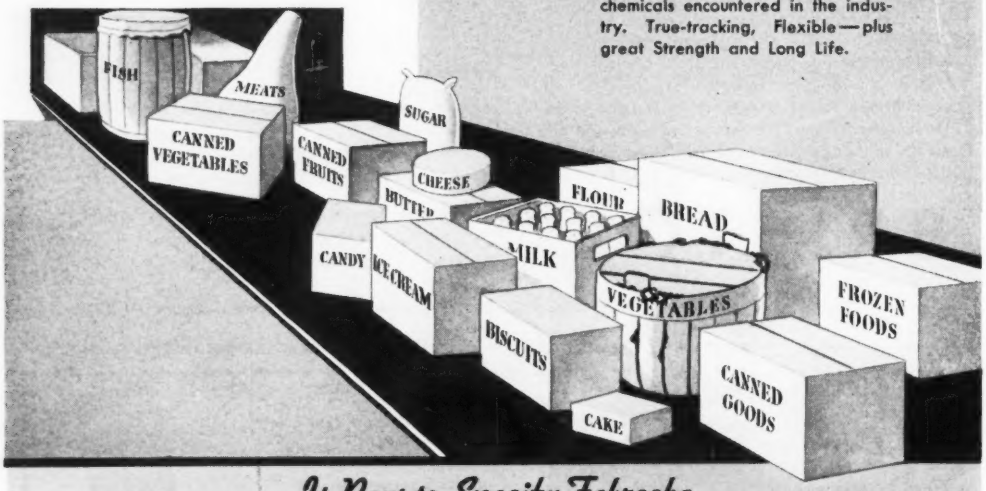
FABREEKA CONVEYOR and TRANSMISSION BELTING

FOOD BELT OF THE NATION!

Increases Production and Cuts Costs in the Processing of America's Food Supply . . . From Field to Dinner Table . . . From Staples to Delicacies . . . From raw product to canned, bagged, packaged, bottled, baked, or frozen foods . . . FABREEKA steps up production and cuts costs all along the line.

Since 1918

FABREEKA Belting prevents costly start-up and production delays . . . has been widely used for years in the Food Industry . . . has freedom from stretch and shrink . . . resists extreme heat, cold, water, brine, and chemicals encountered in the industry. True-tracking, Flexible—plus great Strength and Long Life.



It Pays to Specify Fabreeka

FABREEKA PRODUCTS COMPANY
INCORPORATED

222 F Summer Street, Boston 10, Massachusetts

CHICAGO • DETROIT • NEW YORK • PHILADELPHIA
PITTSBURGH • OAKLAND • SPARTANSBURG

For Food Plant Cleaning

SOLVAY

Trade Marks SOLVAY and Registered U.S. Pat. Off.

QUALITY PRODUCTS

SOLVAY offers you a superior line of cleansers for the food plant. Whatever your needs may be, you may be sure that there is a SOLVAY cleaning product to fit them. You may be sure, too, of the quality of these products . . . for SOLVAY is America's oldest and largest producer of alkalies and associated chemicals. For cleansers of dependable quality, specify SOLVAY.

For General Cleaning

New! Improved!

1 CLEANSER No. 600

A new, greatly improved formulation of one of America's best known general maintenance cleansers. Five modern ingredients combine their special properties to make "tough" cleaning jobs easier, more economical.

2 CLEANSER No. 615

A brand new cleanser of the 600 series, Cleanser No. 615 provides more detergent action for more difficult cleaning jobs. Specially developed for hard water, this product substantially cuts cleaning costs in these areas.

For Refrigeration Brine

3 CALCIUM CHLORIDE

Provides a "long-life" brine that costs less in the long run. Flows easier, requires less pumping; allows safe operation at low temperatures and permits quicker freezing. This quality brine medium assures maximum life of equipment, reduces possibility of costly shut-downs and repairs.

For Special Cleaning

4 CAN WASHING CLEANSER

A brand new Solvay cleanser for machine can washing. Particularly effective for dairy cans, mixing vessels, etc.

5 GREEN LABEL COMPOUND

A new, low-cost can washing cleanser. Particularly effective in soft water. Special wetting agent provides exceptional performance at a low price.

For Heavy Duty Cleaning

6 CAUSTIC SODA

A basic alkali from America's oldest and largest producer. High pH and high neutralizing value give Solvay Caustic Soda "bite" that will do the most difficult cleaning jobs with highest efficiency.

For Bottle Washing

7 ANCHOR ALKALI

One of America's largest-selling bottle washing cleansers because it produces bright, sparkling-clean bottles at minimum cost. Anchor Alkali sterilizes effectively and rinses quickly and completely.

8 ACE ALKALI

Solvay's brand new bottle washing cleanser. A premium product for premium performance . . . Ace Alkali produces exceptional results in the most difficult bottle washing operations and with the hardest water.

9 SPECIAL FLAKE ALKALI

For hydro and spray type bottle washing equipment, where foaming is a problem, specify Solvay Special Flake Alkali for best results.

Mail This Coupon →

For Free Samples and Literature Detailed literature and samples of all these Solvay products are available without any cost or obligation. Here's all you need do—tear out this coupon; put a check mark next to the products in which you are interested . . . print your name and your company name and address in the space below . . . and mail the coupon to us. Your samples and literature will be sent promptly. Don't delay—mail this coupon today!

SOLVAY PROCESS DIVISION, Allied Chemical & Dye Corporation
61 Broadway, New York 6, N. Y.

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9

*Your name*_____

*Company*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____

FI-8

MEASURING FLOW FOR ALL INDUSTRY

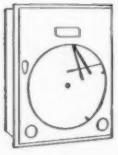
THROUGH the arteries of industrial processes flow countless fluids. Whether they are used by the barrel or by the drop—their rate of flow is closely related to operating efficiency. For this reason, accurate measurement and control of flow have assumed high responsibilities in process supervision in practically every industry.

Because so many varied flow metering applications exist, Honeywell has developed several different families of instruments . . . each suited to a specific purpose. To work with these instruments, Honeywell engineers have designed meter bodies capable of metering the full gamut of industrial fluids, from viscous and corrosive to hot and high-pressure.

for flow accounting

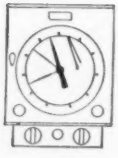
Cost accounting based on consumption of steam, water and other fluids is facilitated by the Brown Evenly Graduated Flow Meter. Its linear scale is easy to read at all flow rates. Its electronic integrator sums up total flow rapidly, accurately . . . is constructionally simple and easily maintained. This instrument is available as a mechanical meter with integral meter body, or as an electric receiver with remote transmission from a distant electric meter body.

for automatic control



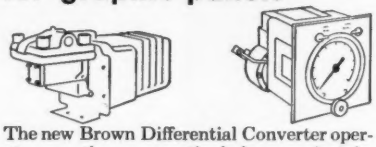
Where automatic flow control is the prime consideration, the Brown Square Root Flow Meter affords extra sensitivity by virtue of its expanded scale. It can be supplied with a wide selection of electric and mechanical meter bodies: low pressure, intermediate pressure and all-purpose; sealed armature type for corrosive materials. Interchangeable range tubes facilitate field change of calibration.

for flow proportioning



Many processes require that flows of two fluids be proportioned to each other—as, for example, fuel and air. For applications of this type, the *ElectroniK* Flow Meter combines many functions in one instrument case. It controls flow in the line which it is metering, resets its control index from a pneumatic signal transmitted to it from another instrument, and in turn retransmits the signal to a third indicator or controller. Cascade control of this sort holds temperature, air flow and fuel flow continuously in balance. The *ElectroniK* flow meter can be equipped with electronic integration . . . utilizes electric transmission from a remote meter body.

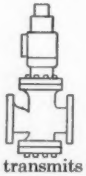
for graphic panels



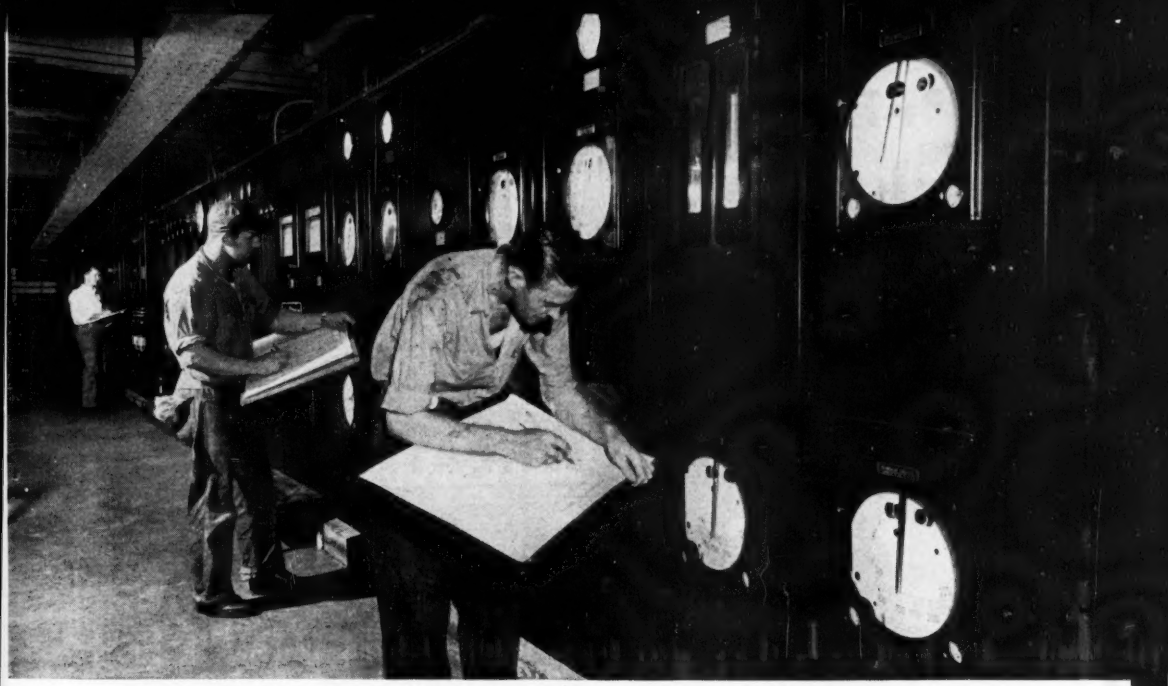
The new Brown Differential Converter operates on the pneumatic balance principle. Of sturdy construction, it uses no mercury, seals or strainers, is especially useful for metering corrosive fluids. It converts the measured pressure differential into a proportionate air output pressure, which actuates a remote flow-measuring instrument. Quick-responding and accurate, the converter is the ideal companion for miniature *Tel-O-Set* indicators, recorders and controllers. *Tel-O-Set* instruments are especially designed for top performance in graphic panel service . . . require only small panel space.

Modern processes demand

for viscous fluids



Flow of heavy oils, hot tar and other viscous liquids is readily measured by means of the Brown area type meter body. This unique device doesn't clog even with materials which would be difficult to measure by other methods. It transmits electrically to the remote meter, and produces a linear output which permits use of an evenly divided instrument scale.



Distillation of fatty acids is regulated from this central panel in the General Mills plant at Kankakee, Illinois, where critical process variables are measured and controlled within close limits by Brown instruments.

in the Food Industry

accurate flow control

In food processing plants, Brown flow meters aid cost accounting by telling exactly how much steam, water or other fluids flow to each production department . . . to each process. They supply data vitally needed for determining operating costs . . . for spotting sources of waste . . . for comparing efficiencies. In the boiler room, Brown flow meters give operators a ready check on individual boiler loading which permits most economical scheduling of load assignments.

In food processing operations which require automatic flow control, Brown instruments supply steam at precisely regulated rates. They often work as part of an interlocked system, which proportions related flows in predetermined ratios.

An additional value that goes with each Brown flow meter is the assurance of prompt, readily available service that helps to keep instruments in top condition. From more than 90 sales and service centers, you can obtain skilled assistance in installation, maintenance and replacement—often within a matter of hours.

Your nearest Honeywell representative will be glad to discuss your plant's flow metering problems, and to recommend the kind of instrumentation that best suits your needs. Call him today . . . he is as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4502 Wayne Ave., Philadelphia 44, Pa.

MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS

First in Controls

● *Important Reference Data*

Write today for Composite Catalog No. 5000 . . . and for Data Sheets on Specific food processing operations.

Prize Packages

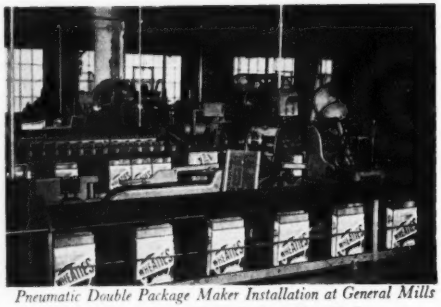
IN ANY CEREAL ROUND-UP

Formed, filled and sealed by PNEUMATIC equipment

No one could deny that General Mills are plenty smart about promoting the sale of their breakfast food trio — Wheaties, Kix and Cheerios. Is there a young'un of your acquaintance who hasn't heard of "Breakfast of Champions"® . . . and who doesn't know the Lone Ranger?

Likewise, no one can deny that General Mills are plenty smart about packaging their cereals, too. They use Pneumatic equipment . . . including the efficient Double Package Maker combination which forms a "package within a package" for maximum product protection.

As a user of Pneumatic machines General Mills is one of the many leading producers of nationally distributed brands that depend on this proven method of volume packaging at a "lower cost per container." This is good evidence for *you* to act on, when you're modernizing your packaging operations.



Pneumatic Double Package Maker Installation at General Mills Modern Cereal Plant, Buffalo, New York

PNEUMATIC

PNEUMATIC SCALE CORP., LTD., 91 Newport Avenue, Quincy 71, Mass.
Also: New York; Chicago; San Francisco; Los Angeles; Seattle; Leeds, England.

Packaging and Bottling Equipment

International Salt Company's Industrial Engineers Will Show You How to

PROFIT BY THESE 4-WAY SALT SAVINGS

1. SAVINGS ON STORAGE by engineering the most efficient and compact salt storage system to fit your situation.

2. SAVINGS IN LABOR by reducing effort and supervision involved in salt or brine handling.

3. SAVINGS ON WASTE through accurate salt measurement and elimination of spillage and spoilage.

4. SAVINGS IN USE. Research and field work with hundreds of industries in many fields equip International to show you how best to utilize salt in your product processing—and for product improvement, too.

If your company uses salt, it will pay you to call on International Salt Company's Industrial Division.

Without obligation to you, this experienced staff of experts is at your service to inform you on latest salt developments in your field and to help on all phases of salt handling and storage, brine making, and salt and brine uses. They can help you save money four ways—and, on the record, the savings can be substantial.

A Complete Service

International Salt Company's Industrial Division is maintained as a service to industry by one of America's foremost salt producers.

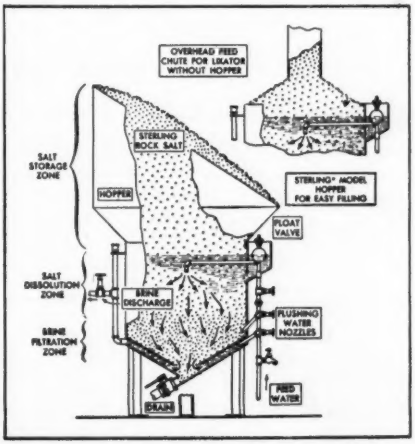
This company produces all types of salt and operates from strategically located mines and refineries. The scope of its operation necessitates familiarity with latest salt developments in every field, many of which have been pioneered by International Salt Company.

LIXATOR*—A NOTABLE EXAMPLE

The Lixator is one of International's outstanding advances in salt technology. Utilizing Sterling Rock Salt, the Lixate principle of self-filtration, invented and developed exclusively by the International Salt Company, provides a steady flow of pure, clean, fully saturated brine.

No handling or attention is required beyond the hopper-loading stage—gravity does all the work. The Lixate Process is adaptable to almost numberless industrial requirements, large or small.

*Reg. U. S. Pat. Off.



INTERNATIONAL SALT COMPANY, INC.

Scranton 2, Pa.

SALES OFFICES: Atlanta, Ga. • New Orleans, La.
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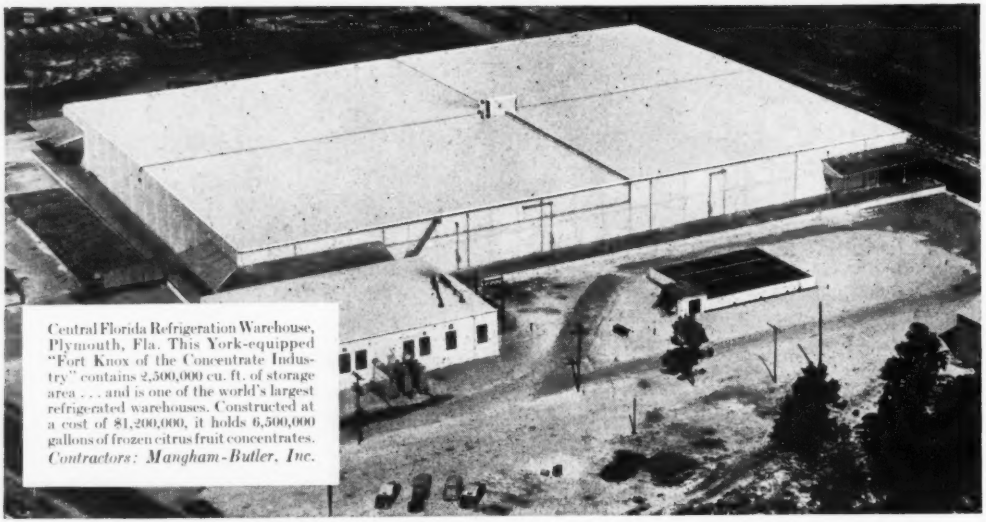
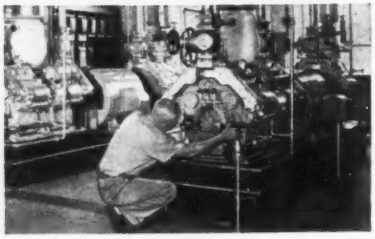
at Florida's "Fort Knox"
YORK chills "Liquid Gold" to Subzero Temperature



Central Florida Refrigeration Warehouse, Plymouth, Fla. This York-equipped "Fort Knox of the Concentrate Industry" contains 2,500,000 cu. ft. of storage area . . . and is one of the world's largest refrigerated warehouses. Constructed at a cost of $1,200,000, it holds 6,500,000 gallons of frozen citrus fruit concentrates. *Contractors: Mangham-Butler, Inc.*



A constant temperature of −10°F. is maintained by 3 York highspeed V/W Refrigeration Compressors at the Plymouth, Fla. plant.

Whatever your product or production quota may be—whatever the size of your plant—you'll profit from these dollar-saving features of York V/W Refrigeration Compressors: 72% power savings at 25% load, and a flexible load capacity which permits you to schedule your work-hours to fit your product load. Many other York features you can't afford to overlook are listed in the panel below.

To further aid you in lowering cooling costs, York provides on-the-job assistance via a nationwide network of Branch Offices—staffed by York-trained specialists in every phase of industrial cooling. Your nearest York Branch Office is as near as your telephone. Call them today or write direct to York Corporation, York, Pa.

THE WORKHORSE OF THE INDUSTRY

low **operating costs** *Reduced starting power requirements. * Pressure lubrication. * Minimum friction with packless shaft seal. * Vibration-free operation with static and dynamic balance. *Valves pinned to prevent wear.

low **maintenance costs** *York V/W Refrigeration Compressors can't wear out—all wearable parts are quickly and easily renewable.

low **initial costs** *You pay only for the machine capacity you need. York V/W Refrigeration Compressors are available in 4, 6, 8, 12, 16 cylinders . . . ranging from 5 to 300 tons. Adaptable to booster and high-stage operation.

low **installation costs** *No special foundations needed. *Ideal for upper floor mounting. *Minimum area and headroom needed for installation.

York refrigeration air conditioning

THE BIG ADVANCES COME FROM **YORK**

HEADQUARTERS FOR MECHANICAL COOLING...SINCE 1885

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or WRITE

PFIZER

for PROMPT DELIVERY on

Ascorbic Acid

• Give us the go sign "Ship Today" and we'll immediately dispatch Ascorbic Acid for *all* your frozen fruit and juice processing needs.

Remember, Pfizer Ascorbic Acid checks the oxidation that causes browning and flavor loss. It gives your fruit packs protection before, during and after freezing. Added to juices, Pfizer Ascorbic Acid enables you to prevent flavor deterioration and, if desired, to standardize the Vitamin C content.

CONTACT PFIZER FOR YOUR ASCORBIC ACID NOW!

Warehouse Stocks at: Brooklyn; Chicago; San Francisco; Vernon, Calif.; Portland and Seattle. Get in touch with our nearest sales office:

CHAS. PFIZER & CO., INC.

630 Flushing Ave., Brooklyn 6, N. Y. • EVergreen 8-3800

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425 N. Michigan Ave., Chicago 11, Ill. • SUperior 7-2526
605 Third Street, San Francisco 7, Calif. • YUkon 6-5921
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Manufacturing Chemists for Over 100 Years

PFIZER QUALITY ®

PFIZER

THERE IS NOTHING LIKE A *Satisfied Customer*

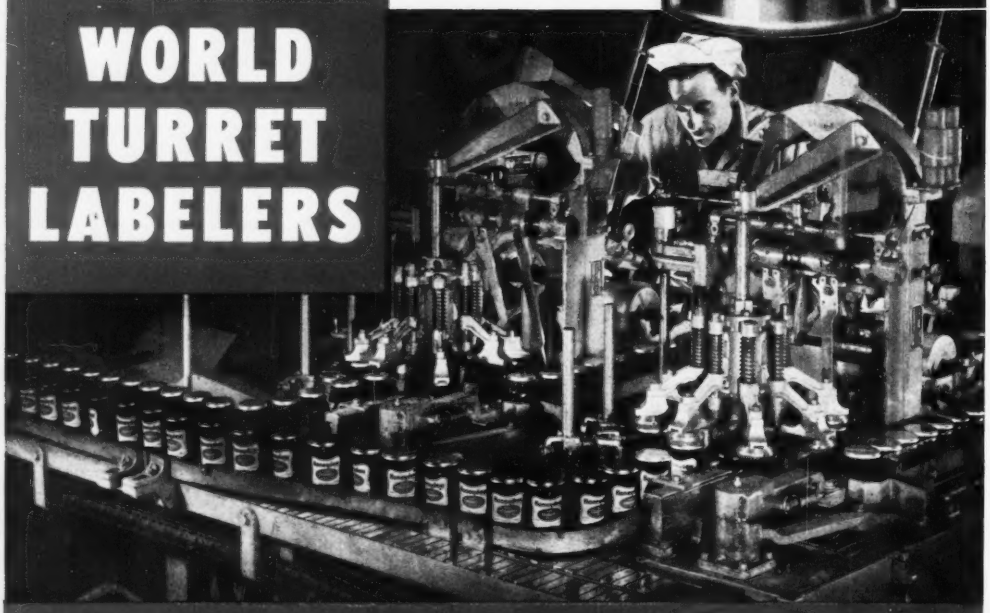
The General Preserve Company of Brooklyn, N. Y., a leader in the Preserve Industry for more than 30 years, installed their first World Twin Turret Labeler in 1945. Ever since, for seven years, this packer of a line of outstanding Preserves, Jellies, and Marmalade, has received top labeling production from this machine — at the rate of 168 jars per minute.

The Factory Superintendent of the General Preserve Company says: "*I like the Turret Labeler because it is economical to operate and easy to maintain. I know I can rely on this machine to perform an automatic, clean, precise labeling job on our own HONEYDEW Brand labels and on the many private brands which are packed in our factory.*"

Naturally, when production demands increased, General Preserve Company ordered *another* World Twin Turret Labeler.

So many packers in glass from coast to coast are doing the same thing — placing repeat orders for the World Turret Labeler. May we tell you how well it will fill the bill for you?

WORLD TURRET LABELERS



ECONOMIC MACHINERY COMPANY
WORCESTER 3, MASSACHUSETTS
DIVISION OF GEO. J. MEYER MANUFACTURING CO.
MILWAUKEE, WISCONSIN
New York Philadelphia Chicago San Francisco Los Angeles Denver Salt Lake City
Seattle Portland Montreal Toronto Winnipeg Vancouver
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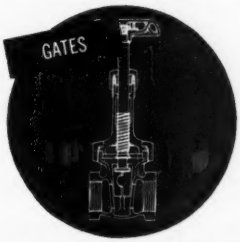
"YOU GET THE BEST LABELERS IN THE WORLD"

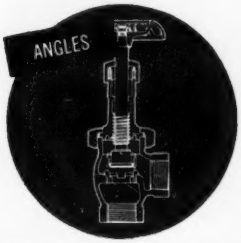
IF YOUR PRODUCT IS VALVE-EQUIPPED—
JENKINS VALVES WILL ADD AN

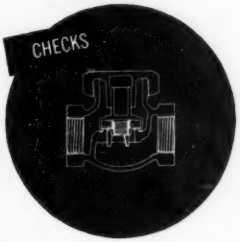
Extra Sales Feature

PACKAGE BOILERS • FIRE FIGHTING APPARATUS

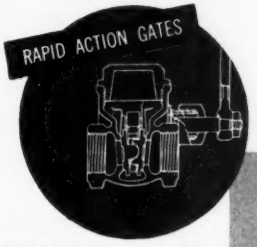


LAUNDRY EQUIPMENT • DISH-WASHING MACHINES

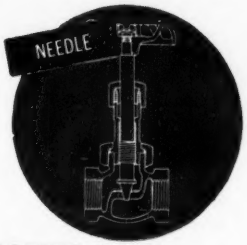




STERILIZERS • PROCESSING EQUIPMENT UNITS



CLEANSING EQUIPMENT • HEATING UNITS



COFFEE URNS • PUMPS AND COMPRESSORS

Here's why—

You gain for your product the prestige of Jenkins Valves built by Jenkins continuous advertising in *Fortune, Business Week* and 25 other publications covering every valve-using industry.

You get the extra sales advantage of Jenkins famous Diamond and Signature trademark which identifies each valve.

...and here's how YOU SAVE TIME AND TROUBLE

You profit by Jenkins long experience in supplying valves for all types of products.

You add the valve know-how of Jenkins Engineers to your own designing skill. Modifications of standard valves, such as special handwheels, etc., can be provided when required. Send coupon today for information.

Give your product, and its purchasers, the *extra value* of Jenkins Valves . . . *it costs no more.* Jenkins Bros., 100 Park Ave., New York 17.

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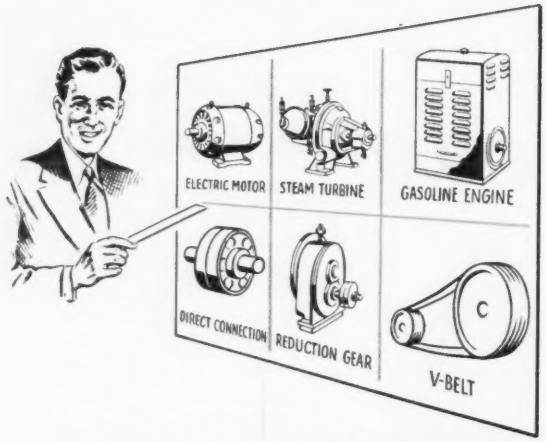
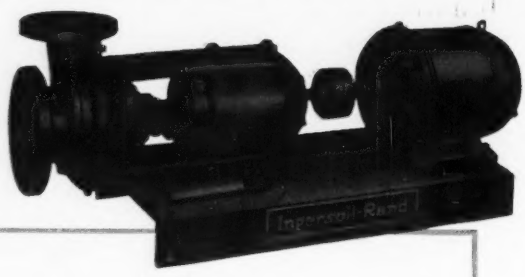


Pick out ANY PRIME MOVER or ANY DRIVE

You'll find the RIGHT COMBINATION for your liquid-moving job in the complete line of I-R CRADLE-MOUNTED PUMPS

They are available in capacities from 5 to 2400 gpm with heads to 500 ft. No matter how "special" your requirements may be, you can get exactly what you want from this standard but superior line of Ingersoll-Rand pumps.



You get all these other advantages, too

Economy of Operation. These pumps are designed to maintain their original high efficiency year after year—making substantial long range savings in your power bills.

Low Maintenance. The driver can be removed or replaced without disturbing the suction or discharge connections to the pump. And the pump itself is easy to get at—with plenty of room to inspect and renew the packing.

Extra Dependability. Careful selection of all materials and extra precision in every step of manufacture mean longer, trouble-free service, even on the toughest jobs.

Quick Delivery. By maintaining large stocks of all standard parts used in the Cradle-Mounted Pump line, Ingersoll-Rand is able to make unusually prompt shipments.

Ingersoll-Rand
11 BROADWAY, NEW YORK 4, N. Y. 778-9

Your nearest I-R representative will be glad to give you further details and help you select the pump that's best suited to your requirements.

COMPRESSORS • AIR TOOLS • ROCK DRILLS • TURBO BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • DIESEL AND GAS ENGINES

For close to 30 years, Glycerine has insured a uniform blend of flavor and prevented dried out edges in every Chase "Pep-R-Mint." Hard and smooth to the touch . . . each lozenge is mellow and creamy to the taste!

FULLY ACCEPTED . . . FULLY AVAILABLE IN ALL GRADES!

In the food processing field, Glycerine's major contribution has been in preserving freshness and maintaining palatability. It is completely acceptable as to taste and odor.

In artificial flavors, extracts, oils and essence, it assures an even and thorough dispersion of both flavoring and coloring materials. It may serve as a sweetener, solvent or blending agent. And recent research has indicated that it will lengthen the shelf life of butter creams and similar perishables by suppressing fatty acid formation.

Only Glycerine can supply this remarkable range of advantages—plus the assurance of physiological safety. Its use has been accepted by medical associations and government agencies . . . and production is meeting the demands of volume users. Its applications? Write for a copy of "Why Glycerine for Foods?"

GLYCERINE PRODUCERS' ASSOCIATION

295 Madison Avenue, New York 17, N. Y.

Prominent Pickle Packers* pick

...MAGNA SPICE CONCENTROLS†

THE MM&R BRAND OF BLENDED SPICE SEASONINGS

*DETAILS ON REQUEST

†T. M. REG. APPLIED FOR

PICKLE PACKERS, like food processors of all kinds, pick MAGNA SPICE CONCENTROLS for controlled seasoning and uniform flavor in every batch — at no extra cost.

So, if you're "in a pickle" call on MM&R. The MAGNA man will gladly work with you to make yours a better product. Write today.

Magnus, Mabee & Reynard, inc.

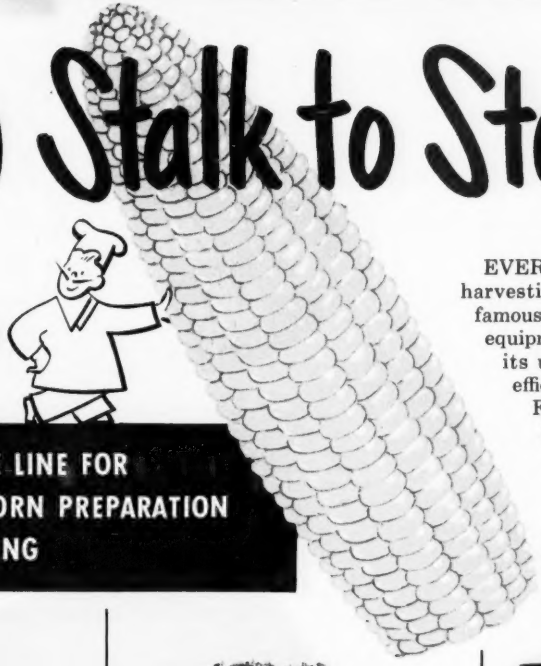
Since 1895 ONE OF THE WORLD'S GREATEST SUPPLIERS OF ESSENTIAL OILS

16 Desbrosses Street, New York 13, N. Y. · 221 North La Salle Street, Chicago 1, Illinois

from Stalk to Storage

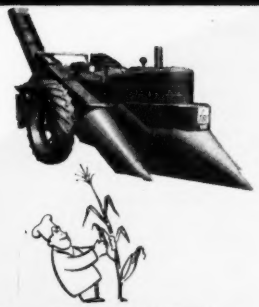
with **fmc**

PERFORMANCE PROVED CORN EQUIPMENT



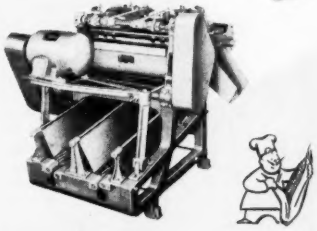
THE COMPLETE LINE FOR PROFITABLE CORN PREPARATION AND PROCESSING

EVERY STEP OF THE WAY from harvesting to casing you can rely on famous FMC "Stalk to Storage" corn equipment to keep costs down, profits up—operations smooth and efficient. For more than 50 years FMC has pioneered in this highly specialized field to meet every requirement of the corn canner & processor. Whether you pack whole kernel, cream style or corn on the cob, canned or frozen, check with FMC *first*—for foremost efficiency.



FMC SWEET CORN HARVESTER

Gets all the corn in the field without damaging ears. Replaces a hand picking crew of 10 for top yield.



FMC DOUBLE HUSKER

Completely strips husks and severs butts at up to 2½ tons of corn an hour. Resultant ears are clean with kernels intact.

FMC EAR CORN BRUSHER

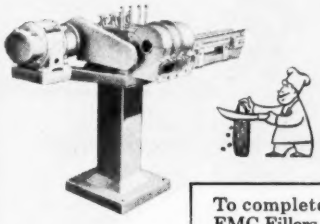
High-speed revolving brushes wash and scrub every kernel of every ear. Two models: the larger handles output of 20 huskers; the smaller, that of 8 huskers.

FMC PEERLESS CORN WASHER

Tumbles, scrubs and rubs ears together under powerful water sprays. Efficiently removes loose husk, silk and dirt.

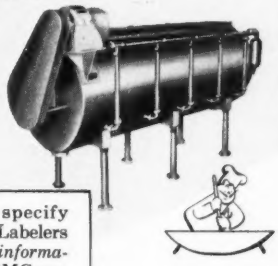
FMC UNIVERSAL CORN CUTTER

Whirling knives cut corn close and clean, the full length and contour of the ear. Provides a highly uniform cut, unmatched recovery.



FMC SANITARY BLENDING MIXER

Meets the most rigid sanitary specifications for processing cream style corn. Heavy duty stainless steel used for all contact parts. Built in 300, 400 and 500 gal. capacities.



To complete your line, specify FMC Fillers, Sterilizers, Labelers and Casers. *Write for full information, or call your nearest FMC representative.*

Diversified Food Equip. fmc

Trade Mark

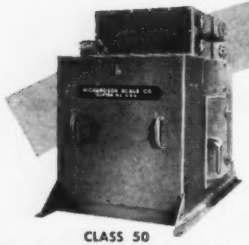
FOOD MACHINERY AND CHEMICAL CORPORATION

Canning Machinery Division

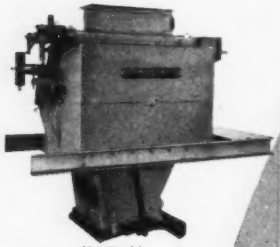
General Sales Offices:

WESTERN: SAN JOSE 6, CALIFORNIA **EASTERN:** HOOPESTON, ILLINOIS

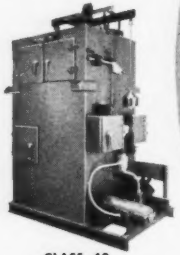
what can WE do for YOU Mr. Processor?



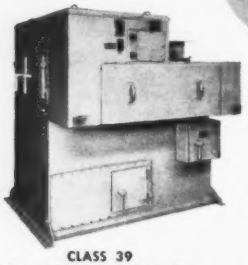
CLASS 50
Dust-tight, all-electric, high-speed, accuracy-indicating scale for weighing dry, ground, granular, dusty, non-free-flowing and some small lumpy materials. Bulletin 3649.



CLASS 38
Dust-tight, heavy-duty scale for dry, ground, dusty, non-free-flowing materials. Bulletin 8946.



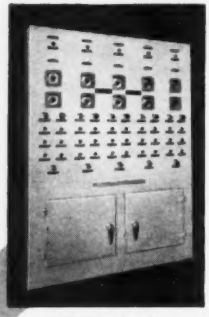
CLASS 40
Accommodates screw, belt, or vibrating feeder for handling wide range of materials. Dust-tight, solenoid- or motor-operated discharge, accuracy-indicating. Bulletin 1449.



CLASS 39
Self-contained, dust-tight, belt-feeding and weighing unit. Accuracy-indicating for process or intermittent batch weighing of lumpy, crushed, sluggish materials. Bulletin 1549.

Frankly, that's the reason we're running this ad—not to tell you about our products, but to ask you about your plant problems. Because if your business involves the handling of any materials or liquids by weight, we think you probably have an operation or two which just doesn't measure up in efficiency, economy, or speed. We'd like to know about it, because we think we can help.

You can call it pride, or conceit, or self-satisfaction, or self-confidence, but our engineers have never been stumped for long by a problem in materials-handling by weight—and in fifty years of working with the biggest names in American industry we've seen a lot of them! From aluminum sulphate, to zinc oxide, and back to almonds we've successfully installed Richardson units or systems to handle just about everything in the book, and built a lot of goodwill and a fair-size company in the process.



CONTROL PANEL
Richardson-designed panels such as this control whole automatic weighing systems composed of scales like those at the left.

Naturally, if a Richardson Scale can contribute to the smoother, faster, or more profitable operation of your plant, we'd like to sell you one. We think that our products and experience can help in solving your problem in processing, and if you'll outline it, we'll be glad to have one of our field engineers arrange to go over it with you.

Or, if you'd just like to know more about Richardson Scales for possible future reference, simply clip this ad to your signed letterhead and mail. Bulletins 0450, 0550, and 0351 will be sent you by return mail—no obligation.

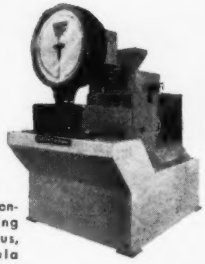
The Richardson Scale Company, Clifton, N. J., will be glad to supply information on:

Feeder-Weigher Systems • Automatic Bulk Weighing Hopper Scales • Automatic Bagging Scales • Bag Sewing Conveyors Packers • Process Control Panels and Select-O-Weigh

Please write direct to our Clifton office, or to the nearest of our branch offices located in Atlanta, Boston, Detroit, Minneapolis, Cincinnati, Wichita, Montreal, Omaha, New York, Pittsburgh, San Francisco, Toronto, Buffalo, Chicago, Philadelphia, Houston, St. Louis.

Richardson
MATERIALS HANDLING BY WEIGHT SINCE 1902

CLASS 56
Self-checking, automatic feeder-weigher for large tonnage; practically continuous stream delivery. Beam system has approval of all weighing authorities. Bulletin 2140-2.



SELECT-O-WEIGH
On electronic weight control system providing remote, instantaneous, dial-control formula changing and ingredient selection for all proportioning applications. Bulletin 0351.

8369

by FIRMENICH

gives finer flavor . . . greater sales appeal . . . to your products

You get the direct and authentic reproduction of raspberries in their full perfection in Raspberry Flavor by Firmenich. For Firmenich took fully ripe raspberries, freshly severed from the stem, captured their delicate and fugitive flavor, and by original research reconstructed it in all its significant and desirable components. Firmenich Raspberry comes to you as a precise and potent flavor material of the utmost purity and stability to enhance the flavor of your products and to make them more attractive to your customers.

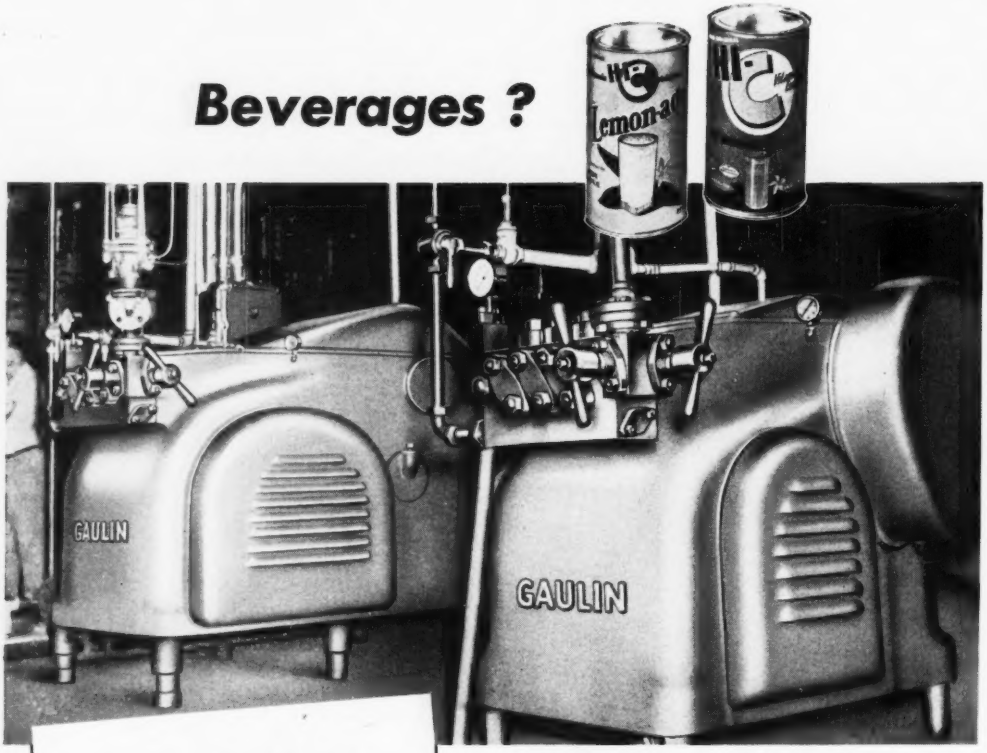
250 WEST 18th STREET, NEW YORK 11, N. Y.

CHICAGO OFFICE: 612 NORTH MICHIGAN AVE.

FIRMENICH OF CANADA, LIMITED, 340 WALLACE AVE. • TORONTO

GENEVA • PARIS • LONDON

Beverages ?



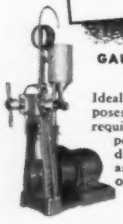
Clinton Foods installation in Clinton, Iowa, showing 1000 and 2000 GPH Gaulin Homogenizers used in making High C orange and lemon drinks.

Here's how GAULIN Homogenizers improve them

In carbonated or non-carbonated beverages, a Gaulin Homogenizer disperses flavoring oils evenly. Stops separation. Accents flavor . . . and makes finer, perfectly uniform emulsions or dispersions.

Experience proves Gaulin Homogenizers disperse them FASTER, MORE ECONOMICALLY, too.

Why not investigate for your product, today. Complete testing facilities and recommendations are yours — without charge or obligation.



GAULIN PILOT PLANT HOMOGENIZER

Ideal for experimental purposes, operation or process requiring up to 25 gallons per hour capacity. Handles quantities as small as one pint. Available on low rental basis.

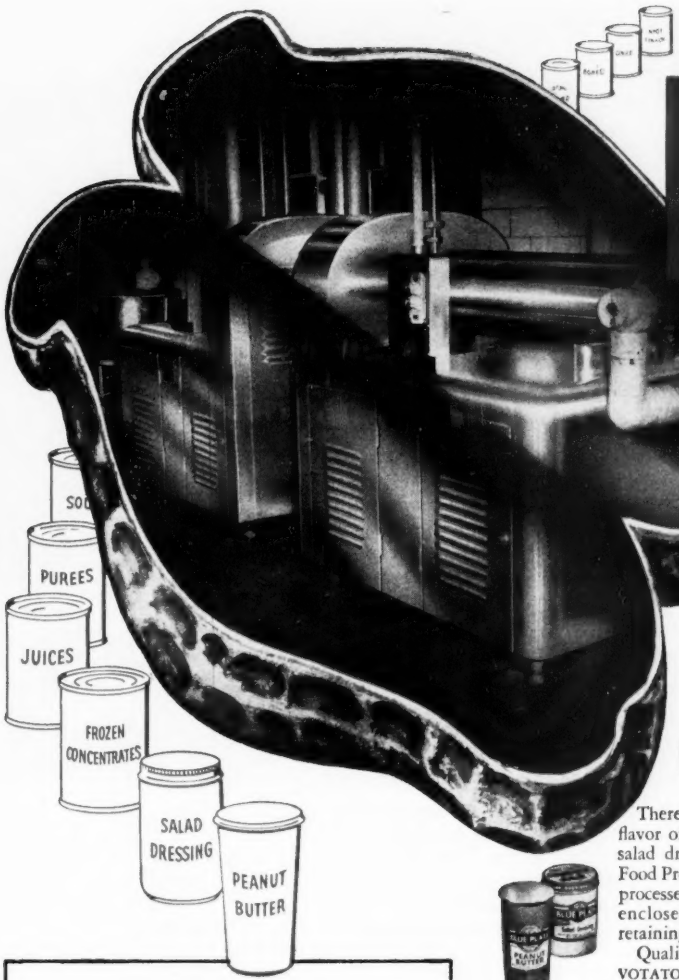
GAULIN TWO-STAGE COLLOID MILL

Stator is jacketed for cooling or heating. Gap setting adjustable for .001" to .045". Only 45 seconds clean-up required in changing colors. 12" head room. 12" x 17" floor area.

Gaulin TRADE MARK

Manton Gaulin
MANUFACTURING COMPANY, INC.
63 GARDEN STREET, EVERETT 49, MASS.

World's largest manufacturer of Homogenizers, Triplex Stainless-Steel High Pressure Pumps, and Colloid Mills



fast continuous processing holds flavor

There's a good reason for the appealing fresh flavor of Blue Plate products – peanut butter, salad dressing, margarine. Using VOTATOR® Food Processing Apparatus, fine ingredients are processed swiftly and continuously in a fully enclosed system . . . guarding purity and retaining flavor.

Quality control isn't the whole story. Since VOTATOR Food Processing Apparatus *processes in seconds,* Blue Plate Foods has made substantial savings in labor costs, time, and space. Result . . . volume production of quality foods at low cost.

Improves many Process Operations. Throughout the food processing field, VOTATOR Heat-transfer Apparatus is used for heating and cooling, sterilizing, plasticizing, emulsifying, crystallizing, quick-freezing and aerating. If you process any liquid or viscous materials, it will pay you to investigate. Call on Girdler for complete process engineering, design, and construction service as well as for efficient processing equipment. Write The Girdler Corporation, Votator Division, Louisville 1, Kentucky. District Offices: 2612 Russ Building, San Francisco 4, California; 2001 Board of Trade Building, Chicago 4, Illinois; 1608 Atlanta Federal Savings Building, 22 Marietta St., N.W., Atlanta 3, Georgia; 150 Broadway, New York 7, New York.

WIDE APPLICATION

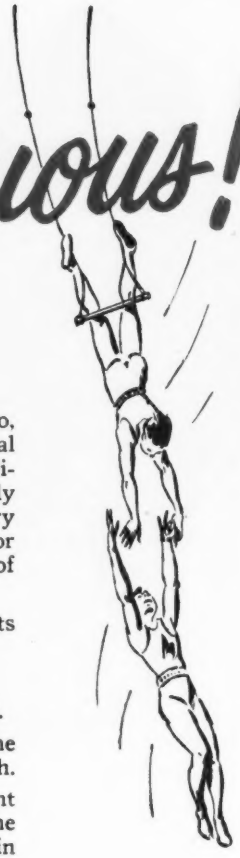
FOOD PRODUCTS	FUNCTION OF VOTATOR APPARATUS
Cream Style Corn	Sterilizing and Cooling
Dog Food	Cooking, Sterilizing and Cooling
Chocolate Milk Drink	Sterilizing and Cooling
Edible Starch (For Salad Dressing)	Cooking and Cooling
Pie Filling	Cooking, Pasteurizing and Cooling
Strained Food	Sterilizing and Cooling
Soup	Sterilizing and Cooling
Lard	Chilling and Plasticizing
Margarine	Continuous Manufacture
Shortening	Chilling and Plasticizing
Sweetened Condensed Milk	Cooling and Crystallizing Sugars
Invert Syrup	Cooling and Crystallizing of Sugars
Eggs	Pasteurizing and/or Chilling
Concentrates, Fruit Juices and Purees	Slush-Freezing
Juice Concentrates	Enzyme Inactivation, Sterilization, Cooling

The GIRDLER Corporation

VOTATOR DIVISION

IT'S GOT TO BE

Continuous!

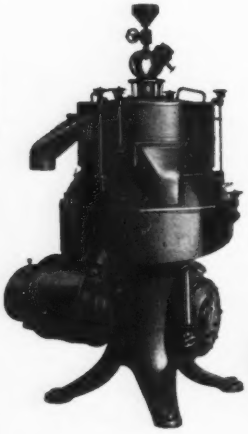


No chance for a pause, here. Food processing, too, must be continuous if it is to be profitable. De Laval centrifugal machines speed up separation and clarification—twin bottlenecks in many otherwise fully continuous processes. They get rid of unnecessary interruptions—replace hours formerly required for settling or filtering with minutes or even seconds of centrifuging.

De Laval centrifugals for food processing plants have three basic applications:

1. Continuous separation of two liquids.
2. Continuous clarification of one or two liquids.
3. Continuous separation of two liquids plus the continuous removal of solids from one or both.

De Laval already has centrifuged many different kinds of food products with complete success. The experience gained in each case may be helpful in applying centrifugal force to your own process. Consult a De Laval engineer; he will gladly discuss the possibilities of making your process continuous.



THE DE LAVAL SEPARATOR COMPANY
Poughkeepsie, New York 427 Randolph St., Chicago 6
DE LAVAL PACIFIC CO., 61 Beale St., San Francisco 5
THE DE LAVAL COMPANY, Limited, Peterborough, Ont.

IT'S De Laval FOR

the First Name in Centrifugals
the First Thought for CONTINUOUS
SEPARATION · CLARIFICATION · CONCENTRATION

New "off-the-floor" Kettles made of ENDURO!

Wall-mounted ENDURO *Stainless Steel kettles designed and manufactured by B. H. Hubbert and Son, Inc., Baltimore, Maryland.*

Here's a new idea in equipment sanitation. It's a wall-mounted installation of steam-jacketed stainless steel cooking kettles. With the floor completely bare—and with a stainless steel backwall—cleaning is easier, faster, more complete . . . even with unskilled help.

This new idea was produced in ENDURO Stainless Steel. ENDURO kettles and other cooking equipment are superbly easy to clean and to keep clean. They stubbornly resist rust and corrosion. Resist heat stain. Chemically-inert ENDURO has no effect *upon* foods, is not affected *by* them. Its smooth, pore-free surface offers no foothold for clinging contaminants.

ENDURO poses no fabricating problems. It can be polished and buffed to a shining, glassy-smooth surface. It has no plating to chip off or wear away. And, ENDURO equipment *lasts and lasts.*

Right now, several ENDURO Stainless Steel analyses are available for your immediate expansion and replacement programs. Republic metallurgists are ready at any time to talk with you and with your equipment suppliers about future applications for stainless steels. Write:

REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

NOW ..see and hear "THE STORY OF STAINLESS"

FULL COLOR 16-MM SOUND FILM
27 minutes running time

The dramatic story of the discovery of stainless steel... how early production problems were solved . . . how the lustrous long-lasting metal grew to its present-day importance. Republic Steel's new film is now available for showing to qualified groups, without charge. Requires 16-mm. sound projector. Send name of organization or group, type of projector, requested date, to: Ideal Pictures Corp., 65 East So. Water St., Chicago 1, Ill.; or write Republic Steel, Dept. K, Cleveland 1, Ohio.

Republic
REPUBLIC STEEL
ENDURO STAINLESS STEEL

Other Republic Products include Carbon and Alloy Steels—Pipe, Sheets, Tubing, Lockers, Shelving, and Fabricated Steel Building Products

Schoettle Case Histories:

true story of a

Purchasing Agent In A Jam

Case History #31 "Mother's Day's 12 days off—we start packing in 6 and there's not a box in the place!" Date is April 29, this year. Phone smoked with frantic pleas of the Purchasing Agent of a major grocery chain*, a Schoettle customer of 20 years. Inventory mix-up had made them skip an annual order for Mother's Day Cake boxes: special glassine laminated cartons, close register 2-color, full cello window. Was *HE* "in a jam?"—you bet! Did Schoettle deliver **May** 5?—*right!* Did thousands of Moms enjoy that wonderful layer cake?—mmmmm, delicious!

Case History #23 This was one of those nice, smooth jobs—million and a half reverse tuck 2-color folding cartons . . . normal delivery date . . . no trouble. Customer, a giant* in the electronics field, had been with us for 26 years. Job was on the press, when . . . *S.O.S.! Triple* the quantity! Need 4,500,000—special order! Any extension on delivery? . . . *NO!* Gotta have 'em on same date! P.A. was "in a jam"! Sweat and tears, sure, but Schoettle delivered those cartons—all of 'em—*on time!*

When you're in a jam about paper boxes—'way out on a limb—you want cartons, not excuses! That's the time to call Schoettle—a 9-story building full of people and equipment dedicated to quality cartons and customer cooperation. A 'phone call will bring one of our Packaging Engineers on the double, to investigate, advise—and produce. Try us and see!

*name on request

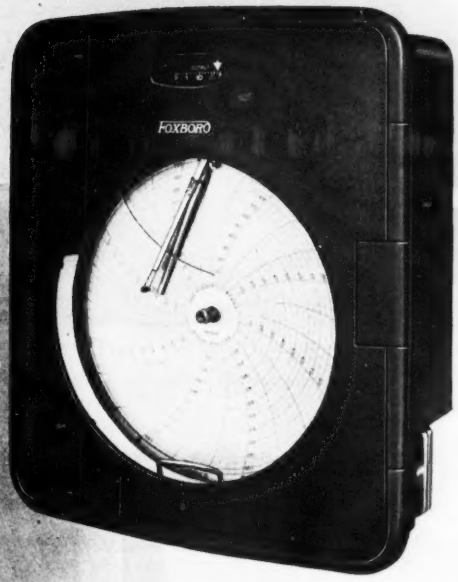
EDWIN J. SCHOETTLE CO.

533 NORTH ELEVENTH STREET • PHILADELPHIA 23, PENNA.

Designers and Manufacturers of Paper Boxes with Buy Appeal

better measurement and control of

HUMIDITY



Ever since the origination of accurate humidity control by Foxboro, this Company has been foremost in the development of instrumentation for absolute humidity, relative humidity, moisture content and dew point . . . whether in gas, air, bulk materials or moving sheet stock. The high quality standards and complete diversity of Foxboro Instruments . . . backed by Foxboro's broad experience . . . offer you unmatched facilities for obtaining the most efficient system for your operation.

INDICATORS • RECORDERS • CONTROLLERS

hygroscopic, wet-and-dry bulb, capacitance, plus the unique "Dewcel" system for continuous recording and control of either absolute humidity or dew point.

TRANSMISSION SYSTEMS • CONTROLLED VALVES

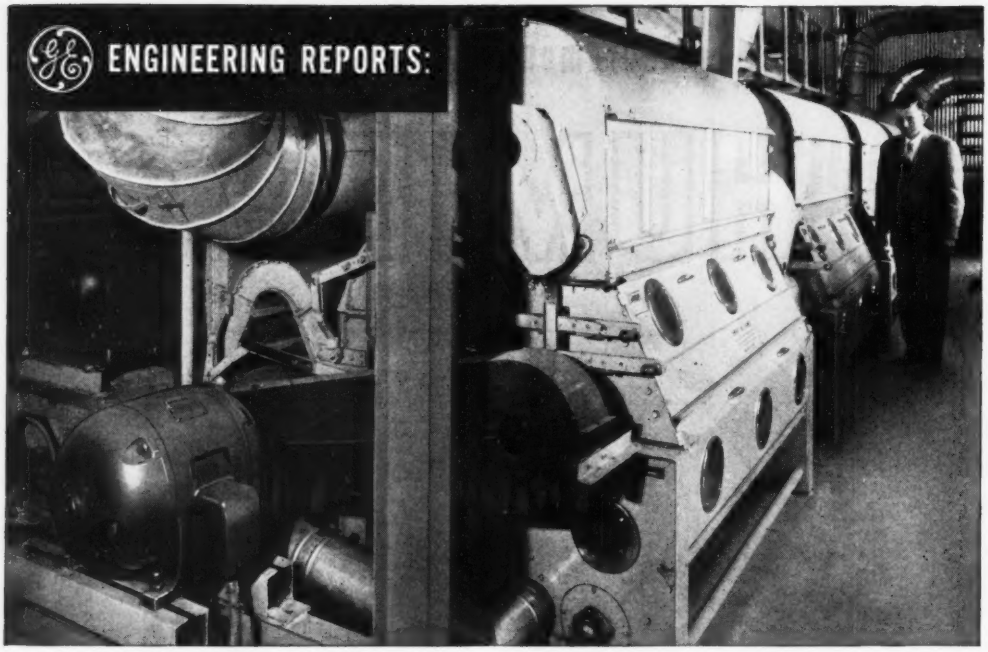
FOXBORO

Reg. U. S. Pat. Off.

specialists in the measurement and control
pressure, flow, liquid level, humidity . . .

COMPANY, FOXBORO, MASSACHUSETTS, U. S. A.

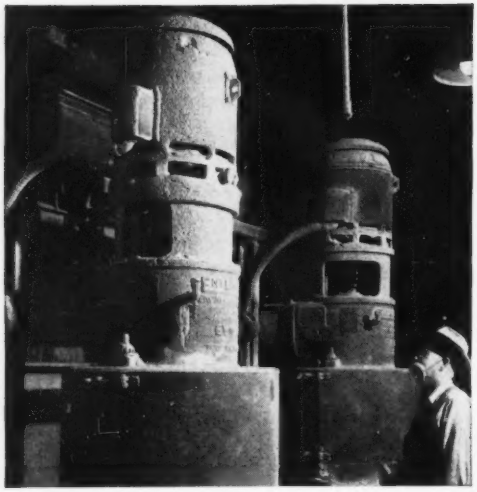
ENGINEERING REPORTS:



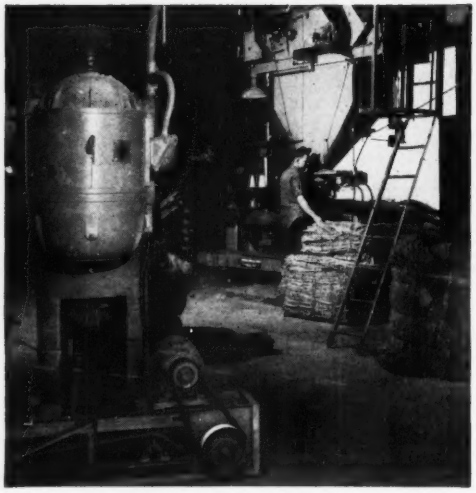
1 **DRIVING THE LINT CLEANER** on this Murray Gin is a standard 15-hp G-E Tri-Clad* motor. Enclosures for motors throughout the plant were carefully selected to meet specific atmosphere prevailing in each area. The gin is one of five, each of which can produce about 450 tons of seed per day when in full production.

*Registered trade-mark of General Electric Co.

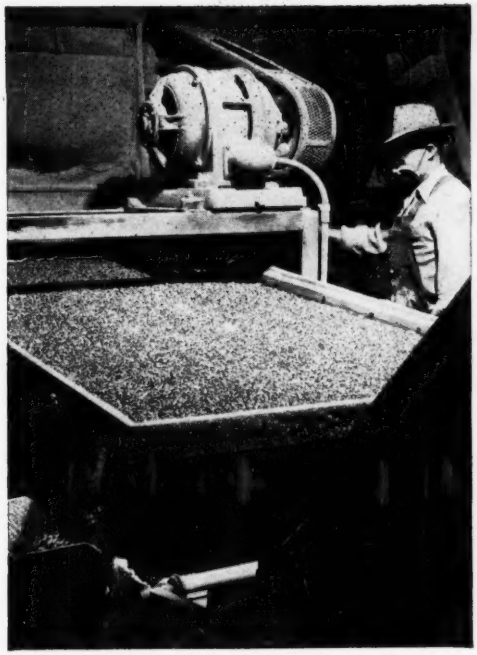
Continuous processing keeps output



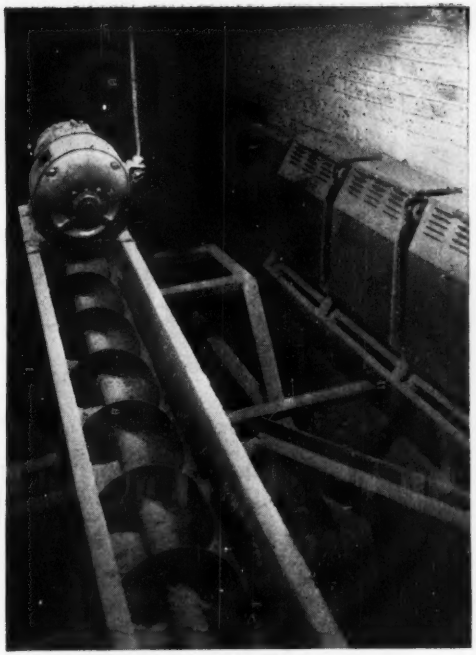
4 **"FOR 24 HOURS A DAY,** these G-E 40-hp vertical motors take heavy loads and never give a bit of trouble," says Tom Degnan, in charge of separator room.



5 **PELLET MACHINE,** driven by 50-hp G-E totally enclosed fan-cooled motor, produces cattle-feed pellets from ground seed. Pellets are sacked by machine at right.

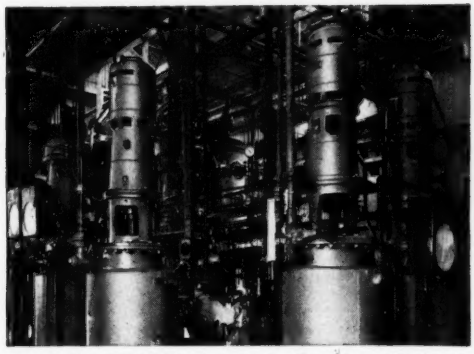


2 **SEPARATOR FREES CRACKED SEED** from hulls. The 15-hp G-E motor shown is standard screenless open textile motor which prevents clogging from lint by means of free flow of air through motor.



3 **AUGER MOVES CLEANED SEED** from separator room. Auger is driven by a 5-hp G-E gear-motor. Three G-E 15-kva, 60-cycle transformers are for lighting circuits in this plant area.

high at Producers' Cotton Oil Co.



6 **IN THE REFINERY,** six re-hydration mixers blend soda ash with cottonseed oil to remove impurities and soap stock. Mixers are driven by 15-hp vertical G-E motors.

76 tons of oil, 191 tons of meal produced per day with help of G-E drive systems

To turn out an average seasonal yield of 21,760 tons of oil and 54,400 tons of meal, Producers' Cotton Oil Company, Fresno, Cal., keep their processing line working 24 hours a day, every day of the season.

One important reason why the plant can produce at such a pace, without let-up, is this: careful planning went into the electrical system. General Electric application engineers—specialists in electrification of food processing—worked with plant engineers and machinery manufacturers to select standard apparatus to fit the specific production and atmospheric requirements of this plant.

If *you* plan to install a new processing line, or modernize an old one, G-E application engineers can help you. Your nearest G-E Apparatus Sales Office will tell you more. General Electric Company, Schenectady 5, N. Y. 652-12

Engineered Electrical Systems for Food Plants

GENERAL ELECTRIC

Let PACKOMATIC help you perfect your package handling!

For Better Service Greater Earnings

TYPICAL PACKOMATIC PACKAGING EQUIPMENT

Shipping Case Gluing and Sealing Equipment:

- Model D Automatic Shipping Case Gluers with Compression Sealers
- Combination Case Loaders & Side Sealers
- Hand Gluers & Compression Sealers.

Carton Filling & Sealing Equipment:

- Telescoping Volumetric Fillers
- Auger Packer-Weighers • Net Weight Scales
- Top & Bottom Sealers for individual & standard packages
- Automatic Case Imprinters
- Serial Numbering (Coding) Devices
- Paper Can cutters, gluers, shrinkers, cappers and conveying equipment

In addition to a wide range of standard and semi-standard packaging equipment, PACKOMATIC is also a dependable source for specialized packaging counsel, design, construction and installation, where unusual carton filling—or shipping case handling—situations present themselves.

Package handling—from carton forming and filling to shipping case gluing and sealing—ceases to be a problem where PACKOMATIC equipment can be adapted to the job at hand.

In fact, throughout more than a quarter of a century of efficient packaging machinery design and construction, J. L. Ferguson Company has refused to accept a package handling situation as a *problem*.

With PACKOMATIC designers, your packaging situation is a *project* to which years of practical experience with some of the world's foremost packaging goods manufacturers is quickly and intelligently applied.

The result may be an automatic top and bottom carton sealer—an automatic telescoping volumetric filler—an auger packer-weigher—or a net weight scale. Again, your particular situation may call for a PACKOMATIC Model D automatic shipping case gluer and sealer, or—if yours happens to be a low speed operation, where total volume is small—a PACKOMATIC hand glue belt compression sealer may be adequate.

Regardless, from your PACKOMATIC packaging consultant you can be assured of suggestions and recommendations that bring the right equipment to the job at hand.

If your own carton forming and filling—your own shipping case gluing and sealing operations—haven't been effectively mechanized, feel free to call on the PACKOMATIC representative nearest you or write Joliet. Consultation involves no cost and no obligation to buy.

AT YOUR SERVICE

PACKOMATIC

PACKAGING MACHINERY J.L.FERGUSON CO. JOLIET, ILL

Chicago • New York • Boston • Philadelphia • Baltimore • Cleveland • Denver • San Francisco • Los Angeles
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an answer to the shortage of 18-8

REZISTAL 430

strong · corrosion-resistant · readily available

Gutters and downspouts are only one of many applications where Crucible Rezistal 430 Stainless Steel offers an adequate substitute for the 18-8 types of Stainless.

Rezistal 430's chromium content assures its resistance to an impressive list of industrial and natural corrosive media. In many of these, its performance approaches that of 18-8. Rezistal 430 also does well under many conditions involving high temperature oxidation and scaling. And what is most important, you can fabricate it by all the standard methods.

We will be glad to send you more information on the corrosion-resisting and mechanical properties of Rezistal 430, or to advise you on its suitability for your particular application. Write us today.

CRUCIBLE first name in special purpose steels

52 years of Fine steelmaking

REZISTAL 430 STAINLESS STEEL

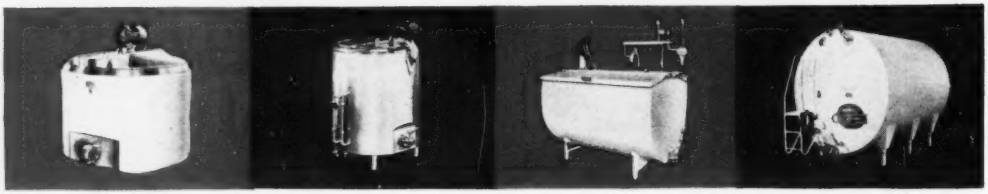
CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

STAINLESS • REX HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

Whatever *you process . . . or plan to process*

CHECK ✓ CHERRY-BURRELL

For Processing Vats *. . . Or Storage Tanks*



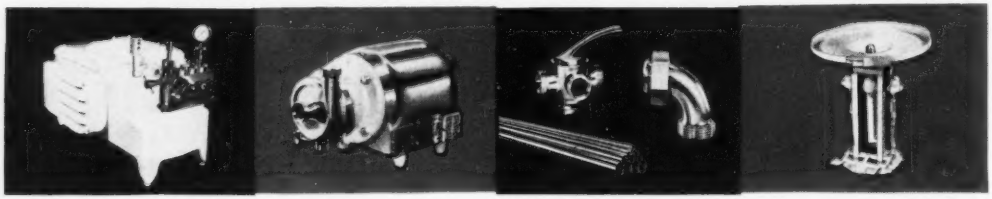
Round Processor: for mixing, heating, holding or cooling. Sizes—300 to 1000 gal. Three types cooling: well and sweet water, enclosed pressure or cold wall and spray. Steam or hot water heating.

Univat: portable or stationary units in 50 and 100 gallon sizes. Completely water jacketed. Gentle, positive agitation for fast heating, thorough mixing and blending.

"CR" Vat: space-saving, all-purpose insulated storage vats for holding products at low temperatures. Available with direct expansion or brine cooling coils. Capacities: 300 to 1000 gal.

Storage Tanks: Sizes up to 7000 gal. Available as "Refrigerated Wall" Storage Coolers, or as Plain or Insulated Tanks with submerged coil, wrapped coil or spray-type cooling. Vertical and special tanks available.

For Homogenizers . . . Or Pumps and Stainless Tubing *. . . Or Container Cleaners*



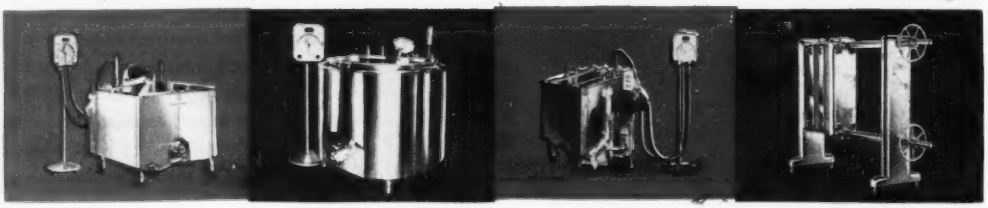
Superhomo: Industry's most advanced homogenizer. Stainless contact surfaces. Patented, throw-away homogenizing valve caps take 98% of valve wear. Single or two-stage valve. Capacities from 50 to 2500 g.p.h.

Flexflo Pumps: Stainless, foamless centrifugals. Smooth flowing body design gives high volume at low horsepower. Easy to dismantle and clean. Six sizes to 18,500 g.p.h.

Sanitary Tubing, valves and fittings. Dense, non-porous, non-corrosive stainless steels. Flavor free . . . easy to clean and keep clean. Maximum interchangeability. Complete line.

Bestov Can Rinser: Rinses and sterilizes containers up to 20 in. diameter. Easy-to-operate pedals release cold water, hot water and steam jets; leave operator's hands free.

For Mixers, Heaters, Pasteurizers *. . . Or Heat Exchangers*



Spray F: Square, 100 and 150-gallon capacity.

Round Spray: Round, 200-gallon capacity.

CC Spray: Rectangular, 200 and 300-gallon capacity.

Superplate: very efficient stainless heat exchanger for continuous heating, cooling, regenerating and *Shortime* pasteurizing of a wide variety of liquid products. Patented knob-type quick heat transfer plates. Easy to clean, or increase capacity. Capacities from 300 g.p.h.

All the above Spray-Type Vats can be equipped with Cherry-Burrell's exclusive, patented Sentinel Control—an automatic, product-quality safeguard that holds temperatures at proper levels . . . automatically cuts off heating water at end of holding period.

Ask for catalogs. Capacities mentioned are in U. S. gallons.

CHERRY-BURRELL CORPORATION
427 W. Randolph Street, Chicago 6, Ill.
Equipment and Supplies for Industrial and Food Processing
FACTORIES, WAREHOUSES, BRANCHES, OFFICES OR DISTRIBUTORS AT YOUR SERVICE IN 56 CITIES

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Please send catalogs on the following:

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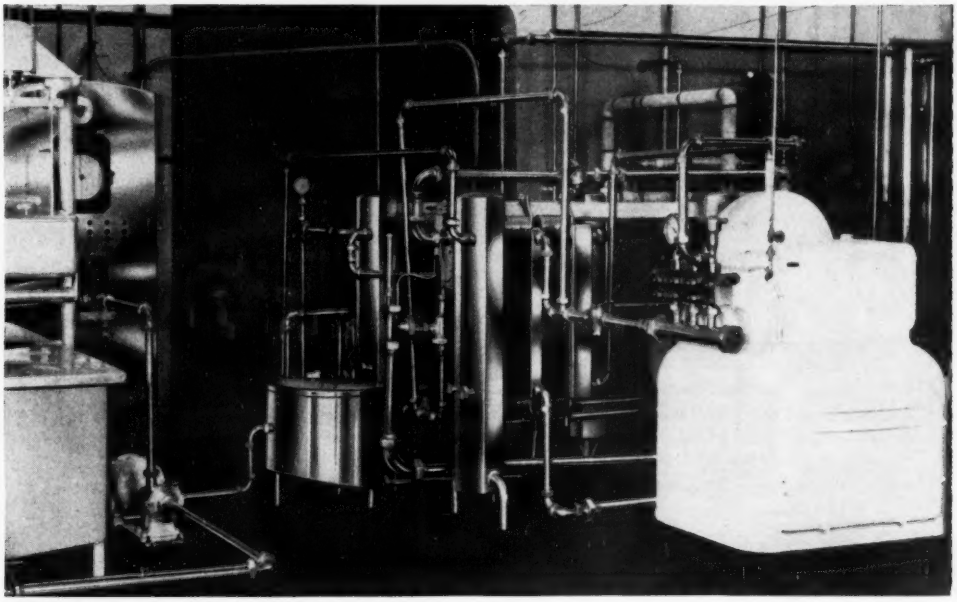


COMPACT ice cream mix making operation at Newman, Calif., creamery is based on homogenizer capacity. Plate HTST pasteurizer permits continuous flow, adds flexibility.

Pushbutton Liquid Mixing

—And Operation Needs Only One Man

Carefully engineered system of standard processing units produces ice cream mixes continuously at rate of 800 gph.

HUGH G. ASSELSTINE and EARL MAY

Golden Valley Creamery Co., Newman, Calif.

Early obsolescence of creamery plant equipment can be traced directly to the ever-increasing pressures to reduce costs, augment efficiencies, and attain higher quality products.

In some cases entirely new machines and equipment are designed. In others, conventional type machines are re-engineered for specific needs and arranged to form either a partially or entirely new processing system.

In our ice cream plant at Newman, Calif., no new units were devised when we launched our move to attain continuous processing of mix. However, the installation is a custom job, planned by engineers who selected specific machines to meet the needs of this process.

▶ Our engineering paid off by developing an all-liquid, continuous, compact, mix-making process incorporating a minimum of operating and labor clean-up costs.

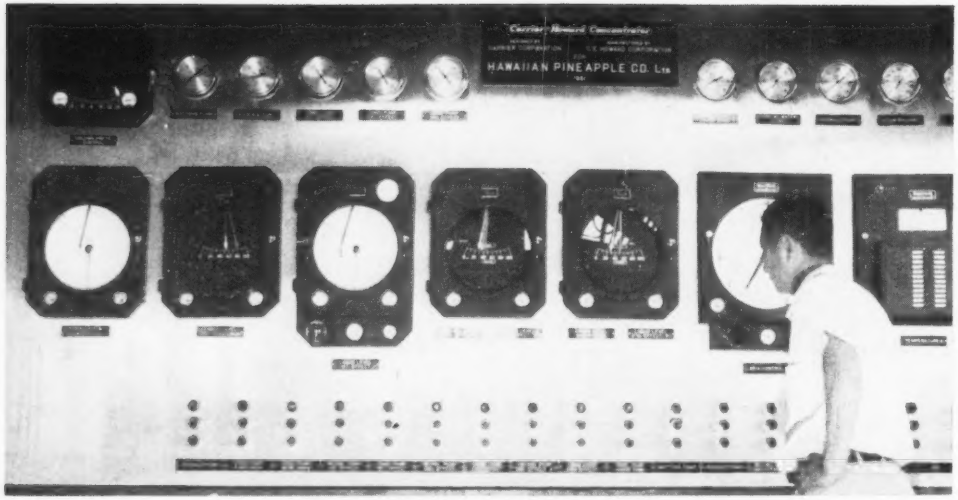
▶ And our ultimate achievement was a pushbutton process by which a single operator can assemble, blend, and pasteurize a variety of ice cream mixes in a continuous operation.

Here is the equipment used in the system: Cold-wall storage tanks for cream and condensed skim; a non-heated tank for liquid sugar (equipped with Westinghouse Sterilamps); a heated storage tank for corn syrup; a 1,000-lb. dial scale with weigh and drop tanks; a 40-gal. balance tank; a Multi-Pass HTST plate pasteurizer with a 25-sec. holding tube; a 800-gal. per hr. homogenizer; a cabinet cooler; pumps; and finished mix cold-wall tanks equipped with agitators.

"Make-Sheet" Used

Complete formulas for each mix are precalculated and the weights placed on a "make-sheet" (see reproduction), which is made out for each mix as well as for each individual scale draft. The

(*Turn to page 157*)



MAIN instrument panel for pineapple concentrator and ester-recovery system brings together all controllers, indicators, and pushbuttons for centralized operation on first Hawaiian pineapple concentrate.

Dole Launches

Frozen Concentrated Pineapple Juice

Start-up of new, modern, million-dollar plant marks long-awaited entry in field . . . ¶ Flavor recovery emphasized in concentrating procedure . . . ¶ 7-step process and role of compressor equipment detailed . . . ¶ Operation runs continuously . . . ¶ Layout permits expansion

A. A. SMYSER
"Food Engineering" Correspondent, Honolulu

Hawaiian pineapple juice is the latest addition to the growing list of frozen concentrates.

Several years of planning and development were climaxed early this summer when the Hawaiian Pineapple Co. (Dole) put its shiny new concentrate plant "on the line."

This million-dollar addition to what is known as the world's largest fruit cannery is laid out to allow future expansion. It now takes up only a fraction of Dole's 57 acres, but will enable the company to turn about a fourth of its juice into concentrate.

The concentrate can, being smaller than the container for single-strength juice, is expected to open the way for substantial savings in both the can operation and in shipping. Refrigerated space will cost twice as much as general cargo space, but the concentrate will only take up one-quarter the volume.

As developed for Dole, pineapple concentration varies in several respects from the more familiar orange juice processing.

▶ One principal difference is the recovery of volatile esters and their re-introduction in the final product.

▶ Another unusual feature is the 24-hr. continuous operation of the new plant, with fresh juice for processing being received only a little over 6 hr. per day.

Essentially, this latter procedure has been worked out by having the new facilities *partially* concentrate and store juice for these 6 hr.—then finish up the evaporation and can and freeze in the other 18 hr. of the day.

During the 6-hr. period, the concentrate-plant freezing tunnel is used to freeze pineapple chunks — thus achieving 'round-the-clock utilization of the equipment with the processing of two products.

Formerly, frozen chunks had been processed by Dole only in cartons. Now it will pack this product in cans at a consderable packaging savings.

Highlights of the new Dole 7-step concentrating process are presented below:

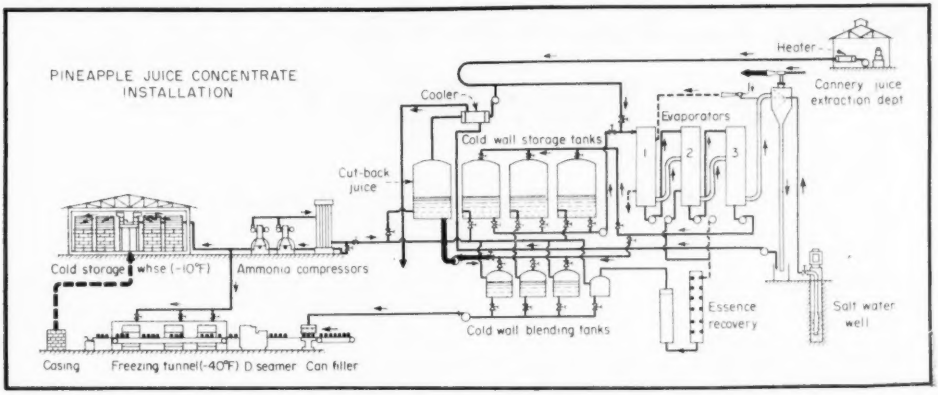
1. Juice—The initial juice is prepared in the usual manner in the existing cannery by extraction from undersized fruit, crushed pineapple, cores, and the leftover meat from the slicing operations.

After extraction, the juice is centrifuged. Pulp specifications are the same as for the single-strength canned juice—15 to 20 percent by volume on the reconstituted basis.

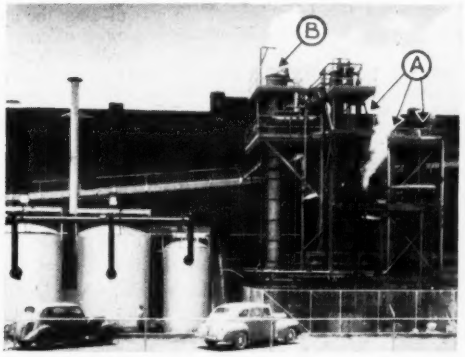
2. Enzyme Inactivation—Bromelin in the juice is partially inactivated by mild heat treatment in conventional shell-and-tube heat exchangers. The juice is then pumped to the concen-

(*Turn to page 169*)

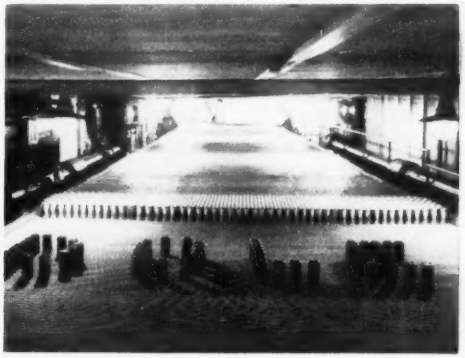
Layout and Key Units of New Facility



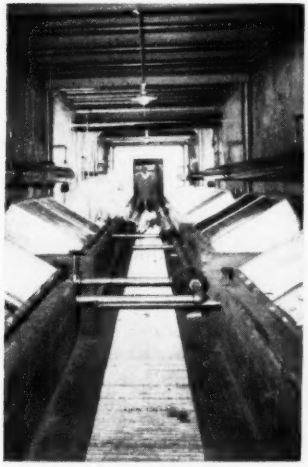
SCHEMATIC of facilities for making new frozen pineapple juice concentrate with volatiles retained.



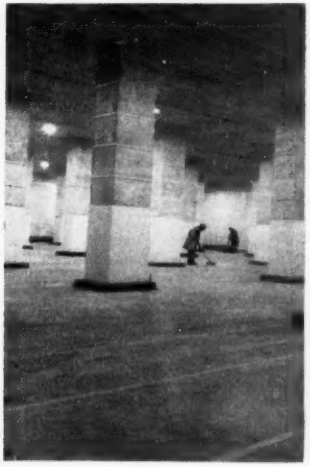
TRIPLE-EFFECT, high vacuum evaporator (A) and volatiles fractionator (B) are outdoors. Note large storage tanks.



INTERIOR view of 86 ft.-long freezer tunnel, used for both concentrate and chunks. It operates with air at —40 F.



AIR CHILLERS direct blast up and through freezer conveyor at top.



MODERN cold room readied to receive U. S.-bound product.

REFRIGERATION operator attends to new V-type ammonia compressor.

What Are You Going to Do With $ . . Your Raise? . . $

Tip: Buy Personal Progress and It'll Pay Double

W. R. VAN METER
Food Technologist, Hartford, Conn.

In the course of events this year, you—the reader of this article—may be among the considerable number of men in the food industry who will have the pleasant experience of getting a "raise," or a bonus, or a promotion to a higher paying job.

Let us hasten to say, however, that we are *not* taking a flyer in the sphere of business prediction. As a matter of fact, with restrictions, controls, costs, and competition what they are, the number of men getting such tangible credit may not be as large, currently, as would otherwise be the case.

Rather, we are referring to promotions, bonuses, and raises as natural factors in the food industry generally—and as vital factors in personal progress specifically.

So—to all of you now making such strides, congratulations! There is a very justifiable feeling of pride which accompanies any increase in the pay envelope. It is recognized by all that the additional money is significant—on the part of both the company giving it and the man receiving it.

The writer can ponder back over a number of years of dealing with technical men, and would like to touch on the uses to which this raise should be put.

Any such comment may appear at first blush to be completely unnecessary. Higher living costs, higher taxes, and the absolute necessity for having a 24-inch television set in the front parlor would seem to leave little choice about what to do with any raise.

Smart Way?

However, we can recall quite a few men who have actually tried to save the major part—if not indeed the total amount—of any raise given them. "I just pretend I didn't get it," they say, usually with a pretty smug air. "Sock it away in the bank and go on living as usual on the old salary—that's the smart way."

To a fair number of technical men that method looks like the canny way of handling a salary increase, but it is actually the worst possible procedure. That is, if the recipient of the raise is looking for further increases in the years ahead.

It has been very wisely stated that the earning of reasonable sums of money is not a particularly difficult job. On the contrary, however, to manage with discretion and foresight the earnings that one acquires is indeed a task demanding a great deal of thought.

A Hope Attached to It

Consider for a moment: A man gets more money because management uses that way in which to express its approbation of his present and past work. Also there is this very important point frequently missed by many men: Management, in giving the raise, is expressing the hope that the man will continue to do outstanding work. In other words, that he will continue to grow—in ability to handle his job and in value to his organization.

Now, it should not be forgotten that all too often growth is a taken-for-granted sort of thing. Like sunrise and nightfall and homogenized vitamin D milk delivered on the back doorstep every other morning. But the only growth that follows so inevitable a pattern—after the age of 20—is the familiar process of simply growing older.

That other sort—growth in ability to handle a job more successfully with increased capability—does not come automatically with the mere passage of time. Its development can never be taken for granted. On the contrary, one must work for it, struggle for it, and plan for it shrewdly.

And to nourish this anticipated growth will unquestionably require the spending of some money.

What, specifically, can a man do, then, to justify management's hope for continued growth on his part?

Two Targets

He has two basic areas for development where he can concentrate his efforts. These are (1) his work and the things directly allied to it; and (2) himself, that is to say his own personality.

In cultivating either of these areas it helps to remember that money is essentially a tool which is useful in accomplishing some desired end and is only valuable when so used.

Do you remember the parable of the talents? It recounted how a certain wealthy man, about to travel into a far country, first called his three servants to him and entrusted to each a sum of money. And two of the servants so shrewdly employed the funds given them that by the time the owner returned they had a 100 percent profit to show him. But the third servant was afraid, and went and buried the sum he had received, thus making no use whatever of it. This money benefited neither servant nor master.

Two thousand years have not blunted the point of that parable. Cash remains cash. Whether it is employed in chasing after blondes or any one of a dozen other diversions, money has to be actively used to have any value.

As regards the work area and things directly allied to it, the following ideas are suggested for keeping your growth-development curve rising:

Set aside some portion of the raise for the purpose of acquiring a wider acquaintance in the field of your work. Seek out and cultivate the friendship of men in your industry whom you would perhaps not ordinarily meet. The exchange of viewpoints cannot help but be stimulating and valuable to you.

Most progressive firms have a definite policy designed to encourage the attendance of their personnel at indus-

try conventions and gatherings. However, all do not. And so if your firm is in this latter group, use some of the raise to attend an annual convention, planning part of your vacation if necessary to make this possible.

Also, there may be courses of study which you have wanted to take, but since they are concerned with the fringe of your main work, possibly you have hesitated to spend money to accomplish what may have little practical value. Consider using part of the raise to carry on such study.

A research chemist friend of the writer did exactly this some years ago when he started to take courses in statistics. At the time, the value of such study seemed definitely nebulous insofar as his work was concerned. The expense, also, appeared a bit on the extravagant side. However, being keenly interested in statistics, he took the courses—and today he finds this knowledge a very great help in his work.

And, it may be mentioned that the company for which he works regards him as a decided asset to the organization because he has shown, and continues to show, the capacity for growth and development which is the life blood of any industrial body.

Packaging, modern instrumentation for process control, or the elementary principles of cost accounting are other examples of fields where you may have wanted to develop more than just a nodding acquaintance with the subject and yet have hesitated because of the expense involved.

It is also commonplace for men in professions such as medicine and dentistry to take "refresher" courses periodically. This is done so that the man practicing the medicine or dentistry can keep himself up-to-date regarding improvements in technique, use of the latest design instruments, changes in current thinking, and the like.

A very large part of the value of such courses for the "student" comes from the stimulus experienced in working directly with pioneering experts.

Why not, therefore, think of taking such a "refresher" course yourself, alloting part of the raise to it to keep abreast of the latest in your field? M.I.T. offers annually an excellent three-week course designed for just such a purpose in food technology. And there are others.

Approach on Personality

What about that other area upon which a man can concentrate some developmental effort? As regards the man himself, how should he use his money?

He should use it to increase his contacts with people. To expand his interests, subscribe to a few magazines, go to concerts or the theater, or take up a hobby. But he should do it all on a "try-and-see" basis, to find out if the activity interests him to the extent that he gets a feeling of satisfaction from it. If it doesn't prove to have any appeal, he ought to try something else.

Remember, that's what money is for—a tool to make it possible for you to find out a great many things about yourself. You are going to be alive on this earth only once, so why not find out as soon as you can all the things that really make you happy to be alive?

One friend of the writer recently learned, at the age of 40, that he gets a lot of fun out of salt water fishing. He could have found it out years earlier and thus have enjoyed the experience all this time.

Use some of the money to have a richer home life. Get your wife out of the kitchen a bit more and make it possible for her to do some of the things she has wanted to do for a long time.

Entertain more. Cultivate the friendship of men in your organization and thus get to know them outside the familiar surroundings of the plant.

Free yourself from some of the routine home chores which almost all of us take for granted. These tasks cost us much in the way of energy used. Moreover, they often prevent us from thinking. To be so busy or so tired from being busy that we no longer have the time or the inclination to think is a very common experience. Yet it is our thinking moments which are the productive ones. We should use some of this money to allot ourselves more of these moments.

Let Mac Do the Mowing

Pay someone else to mow the lawn, to rake the leaves, to shovel the snow, to paint the house, or shingle the garage—and use the time to think. If it's exercise you want, take it in a non-tiring walk and let your brain think along the way.

Thinking is possibly the most difficult work of all—which is one reason why we avoid it so strenuously. But by the same token it is the highest paid.

What to think about? About the job and ways of improving it, about yourself and your plans and what can be done to see that both flourish and grow. Because you will not be happy unless you are growing.

The above suggestions are not all-inclusive. You can undoubtedly add others which may more aptly fit your own situation. Nor, of course, is it remotely imagined that any raise is going to be large enough to include all the suggestions offered. The gist of the argument is simply that what you have been given should be used as a tool, and not as something to be "hid in the earth".

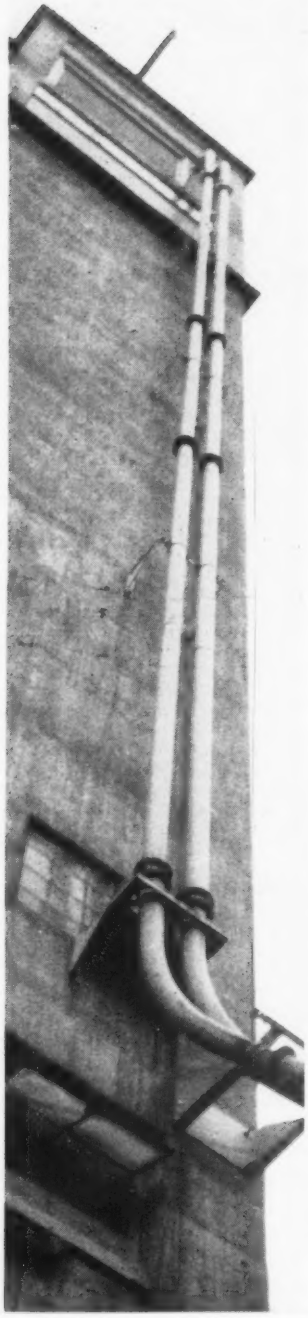
For if you are one of those men who have had a raise recently—or if you are one of that larger group working toward a raise—then you must give some thought to the use of money.

Putting money to work to increase and strengthen your knowledge of your job, your business, and your industry, as well as to broaden your own personality, is one of the best investments you can make. It will inevitably have favorable repercussions among those higher on the ladder, among those who make up management.

Simply as a matter of sound career planning, money should be so used, for it will result in the raise just earned not being the last one ever gained. The man who uses a goodly portion of each raise in ways that insure his continuing growth in ability and business stature can logically expect more raises to follow in due course.

Remember, it is no less true that individuals, just as businesses, must spend money to make money.

"CONSIDER THE OLD PARABLE"



SETS PACE
In Packaging Mixes

Automatic proportioning, continuous mixing, latest in materials handling, advanced sanitation, packaging innovations, and unique bins highlight this new plant

LONNIE R. WRIGHT

Manager, Flour & Mix Production, Pillsbury-Ballard, Division of Pillsbury Flour Mills, Inc., Louisville, Ky.

Specially engineered for blending and packaging mixes and family flours, Ballard & Ballard's new plant at Louisville incorporates many benefit-paying advances.

Beginning with sanitary construction, the improvements in this 11,000-cwt. per day plant extend through materials handling, pretreatment of ingredients, proportioning, mixing, packaging, and cleaning.

Plant operating flexibility heads a list of benefits that includes others of major importance, such as close quality control, easy plant cleaning and maintenance, and materials handling efficiency.

This pace-setting "packaged" 7-story flour plant is built for sanitation. It is a reinforced-concrete structure with poured columns, beams, and floors—measuring 138 x 56 ft. and standing 140 ft. high. Since there is no wood in the plant, and no cracks or crevices in walls and floors, insects don't particularly like the place. And the fact that all equipment is made of steel further discourages them.

TWO AIRVEYORS suck flour from hopper cars and lift it 140 ft. to bin receivers at 30 tons per hour.

Model Materials Handling

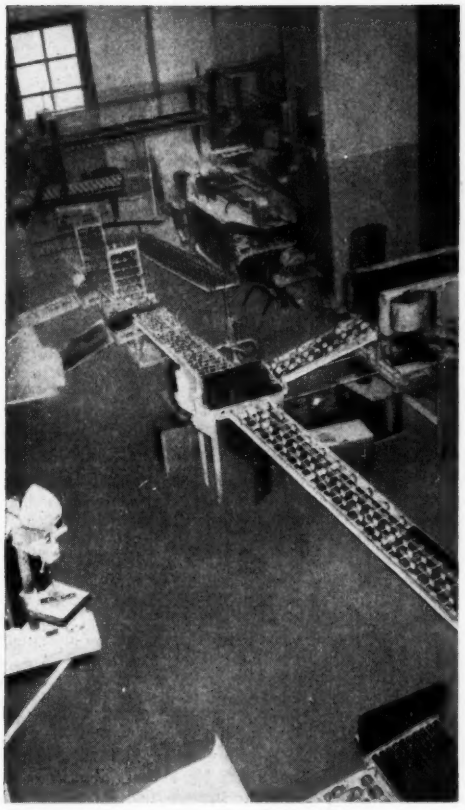
Much saving in back-breaking labor stems from highly efficient handling of materials. Bulk flour comes from the mill 1,000 ft. away (a new mill will be built alongside) in three diesel-towed hopper cars holding 950 cwt. each. The GATX cars contain three compartments and 12 hoppers (of 410 steel) for good down-flow of flour to the outlets.

Six-inch flexible hoses quick-couple to the hopper openings, connecting the car to two 60-hp. Fuller suction handling systems. Unloaded at the rate of 15 tons per hour per air conveyor, the flour is pulled up through pipes outside the building to receiving collectors atop the 7th floor, 140 ft. above.

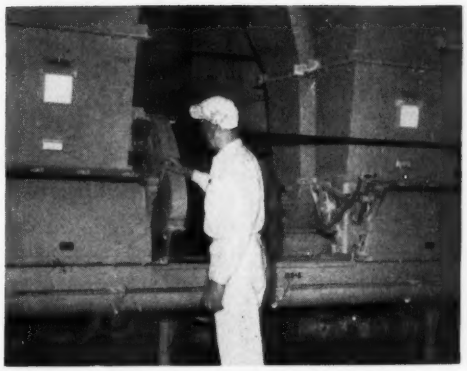
Through rotary airlocks, the collectors discharge flour into screw conveyors that distribute it to 36 concrete bins. Extending from the third to the seventh floor, each bin holds 1,500 cwt.

In this tremendous storage capacity lies the secret of the plant's flexibility. No longer do packaging operations have to keep pace with the flour mill. So the third shift has been abandoned for the good of costs and employee relations, and flour can be packaged when the mill is down for vacations. The bins will supply blending and packaging operations for several days.

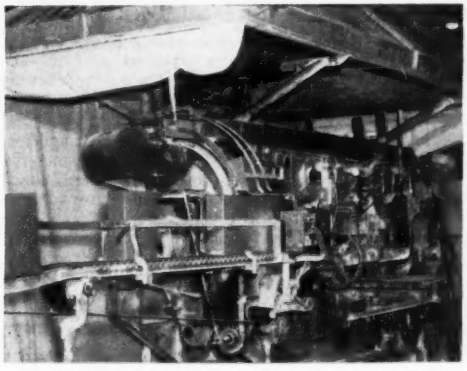
Flour discharges from the bin bottoms through variable-rate volumetric feeders into screw conveyors that empty into elevating bucket convey-



INGENIOUS conveyor arrangement at end of packaging floor speeds containers to selected shipping-floor chutes, providing efficient and flexible materials handling.



AUTOMATIC PROPORTIONERS feed flour from storage bins, into screw conveyor, at start of mixing process.



DUST CONTROL has been carried to nth degree. Suction hoods with drop-curtains take away flour blown off wrapping machines during cleanup.

ors. This arrangement permits blending of flour from different bins.

The elevators take the flour to sanitary bolters on the third floor, and these discharge into Entoleters, which utilize centrifugal impact to destroy any insects or larvae in the flour. Then the product is chuted into surge bins which feed the proportioning and mixing lines.

Another feature of the efficient bulk handling system is the means of feeding filling machines in the packaging department. An enclosed recirculating mass-flow Redler conveyor serves the 10- and 25-lb. bag filling machines. This conveyor makes a horizontal loop over the two machines and continuously recirculates the flour not taken by the volumetric filler hoppers, thereby maintaining a constant head and providing unfailing supply the easy way.

A second mass-flow loop serves the 2- and 5-lb. carton lines. The 1¼-lb. carton filler gets material by chute, as do the 100- and 200-lb. bagging machines.

But efficiency in materials handling does not stop with bulk operations. From the filling machines to the shipping platform on the floor below, the containers travel by conveyor. All packaging lines feed in parallel, from one end of the plant to the far end, where the containers are chuted downstairs to the shipping department.

There are no less than five chutes, and an ingenious bit of flexible conveyorizing permits packages to be directed to selected chutes as desired. The packaging machines discharge onto a transverse roller-wheel conveyor extending across the end of the floor. And this conveyor is sectionalized so that packages can be dropped onto 90-deg. roller conveyors feeding the chutes. This is achieved by hinged conveyor sections that lift to expose chute conveyors and that make a continuous run when lowered.

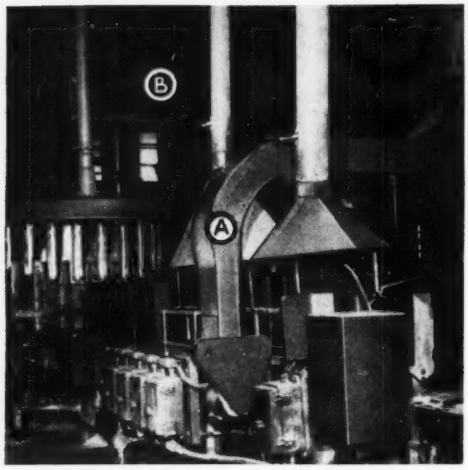
An added feature is a counter-weighted tilt-table at the end of the caser. Turned in one direction, this slides the cartons onto the transverse conveyor to the left. Turned around, it directs the packages to the right to serve different chutes. A home-made gadget, it consists of a steel plate pivoted on a variable-height pedestal and provided with a steel arm to support an adjustable counterweight.

For fast, easy truck loading, chutes near the outside walls direct packages onto conveyor belts running the length of the loading docks on each side of the building. Plows take the packages off at the trucks being loaded.

Other chutes direct packages to the warehouse floor, where they are handled on pallets by lift trucks. A little practical engineering simplifies truck loading later. Pallets are slid into vehicles on a folded section of roller-wheel conveyor.

Tote bins complete the materials-handling picture. Originally purchased to move flour from bulk storage to the

BAG FILLING nozzles have dust pickup hoods as does vibrating conveyor (left) which compacts flour in containers. Conveyor takes bags to automatic sealing machine which completes packaging operation.



CARTON FILLING line includes suction chute (A) which transfers empty cartons from forming mandrels to filler feed conveyor. Filler is supplied with product by recirculating screw conveyor (B).

cake-mix department in the old flour mill, these now serve a different purpose. They catch the discharge from the dust-collector system and carry it to the flour mill to be used in feed. Each of five bins holds 2,700 lb.

Automatic Proportioning

All of the efficiency in preparing the mixes in this plant does not come from materials handling. Much of it results from continuous automatic proportioning and blending of ingredients. Ingredients are automatically measured into the flour stream on the fourth floor. Here, flour from six 200-cwt. storage bins on the floor above supply proportioning-machine hoppers at the head of the blending lines.

Envy of the industry is the formulation and mixing of self-rising flour on continuous stream. A large-capacity feeder discharges flour at a steady rate of 600 lb. a minute into one end of a long screw conveyor. Then Wallace & Tiernan automatic weight-control feeders stationed along the conveyor add closely measured quantities of ingredients to the flour. First is the vitamin feeder, then those for phosphate and salt and soda.

These machines feed a thin layer of the ingredient by gravity onto a short continuous traveling weight-belt, then the belt discharges into the screw conveyor. The scale beam actuates a motor-operated gate to control depth on the belt and therefore the rate of feed. Previously, spiral screws fed the belt, their speed being varied by the scale control through a ratchet mechanism. But the newer gate arrangement has proved simpler and more accurate.

A second blending line handles high-grade enriched flours. Here, a rotating-pocket volumetric Draver feeder supplies flour to one end of a screw conveyor, this feeder having a variable-speed reducer-gear drive that replaced a variable-ratchet mechanism. Next on the line is an Omega volumetric vitamin feeder. This unit has a rotating horizontal grooved disk, the ingredients feeding into the groove from a hopper and being plowed into the discharge chute by a scraper. Speed of the disk determines rate of feed. Another unit of this type proportions phosphate into the blend.

On both of the blending lines, final mixing of proportioned ingredients is achieved in a continuous Howes duplex unit with agitator blades on two parallel shafts. The pitch of the blades moves the material from one end of the mixer to the other in 15 sec., discharging it into a bin below. There is a dust collector on the end of the screw conveyor feeding this mixer.

But when it comes to making the pancake, buckwheat, and cornbread mixes, Ballard still uses a 3,000-lb. batch mixer. The flour is measured out in a Fairbanks-Morse hopper scale, into which corn meal or other ingredients are then drawn through chutes from bins above. Salt, soda, and other minor ingredients, are weighed out of adjacent bins by hand.

Packaging Innovations

To keep pace with the high-speed blending and mixing lines requires a large packaging department. And to simplify supervision, maintenance, and cleaning, all packaging lines are on the second floor. Here are a 60-package-per-min. mix line, a 40-per-min. 2-lb. flour line, a 60-per-min. 5-lb. line, a 20-per-min., 10-lb. line, and a 10-per-min. 25-lb. line, plus a packer that fills six 100-lb. bags a min. and another that handles four 100-lb. or one and a half 200-lb. bags a min. There also are carton tight-wrapping machines, an automatic caser and sealer, and vibrators to settle the flour in the containers.

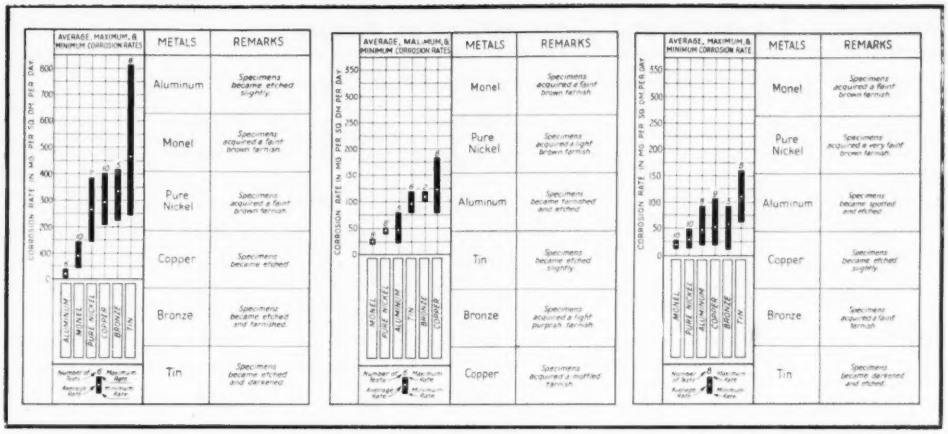
At every point where dust may be generated, such as the bag filling spouts and the package vibrators, suction hoods are provided in the interest of plant cleanliness. And a particular innovation is a large metal suction hood over each tight-wrap machine. It carries away flour blown off the machine by air hose during clean-up. It really is a hood within a hood, the suction inlet space being around the periphery between the two canopies of metal.

With this arrangement, the relatively narrow inlet gives enough suction velocity to pick up the dust. The hoods are provided with roll-up curtains that are dropped around the machine to form a dust-tight enclosure during cleaning.

Another innovation is the addition of a Syntron electromagnetic vibrator to the tubular-type volumetric carton filler. The gentle vibrations result in more compact and uniform carton fill.

Newest packaging unit is a Bemis

(*Turn to page 188*)



GRAPHS show results of corrosion tests made on metals in various stages of tomato processing: Left: Hot surge tank. Center: Scalding tank. Right: Catsup finisher. Samples of six different metals were used in the tests.

Technical Facts for Food Processors on

Nickel and High-Nickel Alloys

PART I—Corrosion Fundamentals and Specific Data on Tomato Units

EXPERIENCE has demonstrated that the exacting requirements of materials used in food processing equipment are satisfied by nickel and high-nickel alloys. The requirements are:

1. Availability, at a reasonable price, in the forms and in the properties required for fabrication, and amenability to fabrication by a variety of methods.

2. Durability—resistance to corrosion by products handled, by cleansing and sterilizing compounds, and by heating and cooling media.

3. Absence of detrimental effects on the product.

4. Ability to transfer heat at a satisfactory rate.

Nickel, Monel, and Inconel are available in all common forms, such as bars, rods, sheets, strip, plates, tubes, wire, wire cloth, and castings. The range of mechanical properties available in sheet, strip, and tubing—the forms in which these materials are most commonly used in the food processing industry—is shown in Table I.

Durability of equipment is only one part of the corrosion problem in food plants. Of at least equal importance are the possible effects of corrosion products on the quality of the foodstuffs. The latter range from the weakly alkaline solution of many cooked vegetables and meats to a definitely acid condition in many fruits and in sour milk.

Some foods contain weakly active sulfur compounds, and most of them are reducing rather than oxidizing in their reactions.

In considering corrosion by foods, therefore, a peculiar emphasis is required. The question often is not one of deterioration of the metal but rather of the effect of the metal on the foods. While this factor needs consideration in the handling of many chemicals such as dyestuffs, it is of unusual importance in the case of foods. In most cases this means an order of magnitude in the allowable corrosion rate quite different from the limits for metal deterioration. Corrosion at a rate low enough to be un-

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EDITORS' NOTE: Highlight sections, charts, and tables of a comprehensive forthcoming bulletin, *Corrosion Resistance of Nickel and High-Nickel Alloys in Food Processing*, have been collated by FE into a special two-part article, of which this is Part I.

Covered here are the general compositions and characteristics of the metals and their heat transfer rates. And there is detailed information for tomato canners.

Part II, to appear in September, will include data relative to refrigeration brines and such specific processes as citrus fruits, breakfast cereals, peas, and corn.

The special bulletin has been prepared by the Development & Research Div. of the International Nickel Co., Inc., which has granted FE exclusive permission to publish this material in advance.

Mechanical Properties and Compositions of Metals

TABLE I—Mechanical Properties of Monel, Nickel and Inconel Sheet, Strip and Tubing

	Yield Strength 0.20% offset (1,000 Psi.)	Tensile Strength (1,000 Psi.)	Elongation in 2 In. (Percent)	Hardness (Rockwell B)
MONEL				
Standard cold-rolled sheet	24–45	70–85	50–30	61–73
Special cold-rolled sheet and strip				
Annealed	24–45	70–85	50–30	68 max.
Hard sheet	90–110	100–120	15–2	94 min.
Full-hard strip	90–130	100–140	15–2	98 min.
Cold drawn, annealed tubing	25–45	70–85	50–30	65–70
Cold drawn, as drawn tubing	60–120	90–125	20–10	90–23 [1]
NICKEL				
Standard cold-rolled sheet	15–45	55–80	50–35	40–70
Special cold-rolled sheet and strip				
Annealed	15–30	55–80	55–35	55–70
Hard sheet	70–105	90–115	15–2	92 min.
Full-hard strip	70–115	90–130	15–2	96 min.
Cold drawn, annealed tubing	10–30	50–80	50–35	40–65
Cold drawn, as drawn tubing	50–80	70–95	35–15	80–100
INCONEL				
Standard cold-rolled sheet and strip				
Annealed	30–45	80–100	55–35	76–88
Half-hard	90–125	125–150	15–2	21–26 [1]
Full-hard	100–160	140–170	10–2	27 min. [1]
Cold drawn, annealed tubing	30–50	80–100	50–35	65–85
Cold drawn, as drawn tubing	65–140	110–160	20–2	8–35 [1]

[1] Rockwell C Scale.

TABLE II—Nominal Compositions of Metals and Alloys Used in Corrosion Tests

Material	Nickel Percent	Copper Percent	Chromium Percent	Iron Percent	Molybdenum Percent	Silicon Percent	Manganese Percent	Carbon Percent	Tin Percent	Zinc Percent	Lead Percent	Others Percent
Monel	67.0	30.0	.....	1.4	.....	1.0	1.0	0.15	.....	.....	.....	.....
Nickel	99.4	0.1	.....	0.15	.....	0.05	0.2	0.1	.....	.....	.....	.....
Inconel	78.5	0.2	14.0	6.5	.....	0.25	0.25	0.08	.....	.....	.....	.....
Copper	.....	99.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silicon bronze	.....	96.0	.....	.....	.....	3.0	1.0	.....	.....	.....	.....	.....
Chemical lead	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	99.9	.....
Hastelloy B	60.0	.....	.....	6.0	32.0	1.0	1.0	.....	.....	.....	.....	.....
Hastelloy C	51.0	.....	17.0	6.0	19.0	1.0	1.0	.....	.....	.....	.....	W 5.0
Durimet T	22.0	1.0	19.0	Bal.	3.0	1.0	.....	0.07 max.	.....	.....	.....	.....
Duriron	.....	.....	.....	Bal.	.....	14.5	.....	.....	.....	.....	.....	.....
Tin	.....	.....	.....	.....	.....	.....	.....	.....	99.75	.....	.....	.....
Zinc	.....	.....	.....	.....	.....	.....	.....	.....	.....	99.9	.....	.....
Aluminum 28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Al 99.0
Commercial bronze	.....	85.0	.....	.....	.....	.....	.....	.....	5.0	5.0	5.0	.....
Yellow brass	.....	65.0	.....	.....	.....	.....	.....	.....	.....	35.0	.....	.....
Nickel silver 18%	18.0	72.0	.....	.....	.....	.....	.....	.....	.....	10.0	.....	.....
Soft solder	.....	.....	.....	.....	.....	.....	.....	.....	50.0	.....	50.0	.....
Mild steel	.....	.....	.....	Bal.	.....	.....	0.3–0.5	0.20 max.	.....	.....	.....	.....
Ni-Resist (Type I)	13.5–17.5	5.5–7.5	1.75–2.50	Bal.	.....	1.0–2.5	1.0–1.5	3.0 max.	.....	.....	.....	.....
Ni-Resist (Type II)	18.0–22.0	0.5 max.	1.75–2.50	.....	.....	1.0–2.5	0.8–1.5	3.0 max.	.....	.....	.....	.....
Ni-Resist (Type III)	28.0–32.0	0.5 max.	2.5 –3.5	.....	.....	1.0–2.0	0.4–0.8	2.75 max.	.....	.....	.....	.....
Cast Iron	.....	.....	.....	Bal.	.....	1.5–2.5	0.5–1.0	3.0 –3.5	.....	.....	.....	.....

important in metal deterioration may often be sufficient to be ruinous to a delicate food. For instance, a minute amount of iron will have a great effect on the color of fruits and wines, and a small amount of copper will change the flavor of milk.

Test Data Presented

The corrosion test data presented here are designed to indicate the probable durability of nickel and high-nickel alloys as well as any other materials that might have been included in the particular investigations for comparison purposes. At the same time, the data may be used as a rough indication of possible metallic pick-up by the solution when there is definite information as to the volume of liquid being handled, the area of contact between liquid and metal, and the duration of contact in a particular piece of equipment.

The nominal compositions of many of the metals and alloys included in the various test studies are shown in Table II.

Much has been written and said on the harmful effects of metals in foods on the health of consumers. This is not a subject to be passed over lightly. However, in certain cases the dangers of metals in foods have been exaggerated. Most foods will be so changed in appearance or flavor as to be unpalatable before the content of any metals likely to be encountered in processing equipment reaches an unwholesome amount. Some metals are a usual and necessary constituent of foods.

In this connection, it has been found that nickel equipment as it

is used in food processing is nontoxic. This statement is based upon the results of several investigations made to determine the safety of using nickel equipment in the preparation of foods.

An excellent summary of the situation was made by Drinker, Fairhall, Ray, and Drinker[1] of the Department of Physiology, Harvard School of Public Health, who supplemented a study of the work of other investigators by tests of their own.

It was further demonstrated by the work of Pratt[2] at the University of Rochester that nickel does not catalyze the destruction of vitamins in milk, one of the most perishable of foods. In his studies he compared milk containing on the average about 15ppm. of nickel with milk containing no nickel, and his principal conclusion was that nickel dissolved from a nickel vessel did not destroy or catalyze the destruction of vitamins A, B, or C during the pasteurization.

In most heat exchange apparatus the overall resistance to heat flow is made up of several resistances which include, of greatest importance, films

(Turn to page 218)

[1] Drinker, Fairhall, Ray, and Drinker, "The Hygienic Significance of Nickel," *The Journal of Industrial Hygiene*, VI, No. 8, 307-356, (1924), Dec.

[2] W. E. Pratt, "Does the Nickel Dissolved From the Container During Pasteurization Catalyze the Destruction of the Vitamins of Milk," *Journal of Nutrition*, 3, No. 2, 141-55, (1930).

Heat-Transfer Data Correlated

TABLE III—Thermal Conductivity of Metals and Alloys

Material	Conductivity[1] Btu./Hr./Sq.Ft./Deg. F./In.
Silver	2,900
Copper	2,680
Aluminum (28)	1,570
Red brass (85–15)	1,100
Yellow brass (65–35)	830
Zinc	770
Admiralty brass	760
Tin	455
Nickel	420
Mild steel (SAE 1020)	380
Lead	240
Nickel silver (18 percent)	230
Silicon bronze	225
Cupro nickel (70–30)	200
Monel	180
Stainless steel (Types 304, 316, 321)	105
Inconel	105

[1] These values are for a temperature range of 32 to 212 deg. F., and are taken from published data. Values at other temperature levels are slightly different. Individual measurements may indicate values different from those listed, since for any metal or alloy this property varies from melt to melt and with different forms, tempers, etc.

TABLE V—Effect of Metal Thickness on Heat Transfer Rates in Steam Jacketed Kettles

Nickel

Metal Thickness	Overall Coefficient of Heat Transfer B.t.u. Per Sq. Ft. Per Deg. F. Per Hr.			
	0.093 In.		0.172 In.	
	Heating	Boiling	Heating	Boiling
Maximum	385	785	405	710
Minimum	308	647	327	646
Average of all tests	358	716	367	675

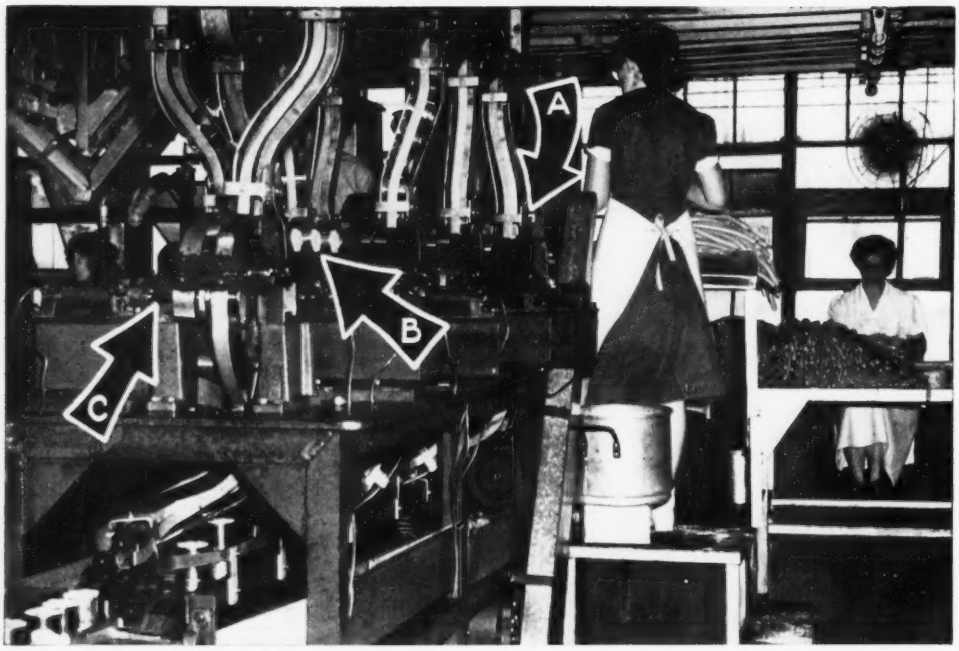
18-8 Stainless Steel

Metal Thickness	Overall Coefficient of Heat Transfer B.t.u. Per Sq. Ft. Per Deg. F. Per Hr.					
	0.093 In.		0.109 In.		0.125 In.	
	Heating	Boiling	Heating	Boiling	Heating	Boiling[1]
Maximum	260	550	208	322	236	547
Minimum	230	460	197	308	153	532
Average of all tests	245	513	203	315	194	503

TABLE IV—Heat Transfer Tests in Steam Jacketed Kettles

Run No.	Metal	Metal Thickness (Inch)	Effective Heating Area (Sq. Ft.)	Capacity of Kettle (Gallons)	Steam Pressure on Jacket (Psi.)	Time Required to Bring Water to Boil, from 64° F. (Minutes)	Weight of Water Evaporated in 15 Min. (Lb.)	Overall Heat Transfer Rate (U, in B.t.u. Per Sq. Ft. Per Deg. F. Per Hour)[1]	
								Heating	Boiling
SERIES A.—840 Lb. of Water Heated From 64 Deg. to 212 Deg. F. and Then Boiled for 15 Min.									
1	Nickel	0.172	18.4	250	25	10.5	186	339	710
2	Nickel	0.172	18.4	250	25	10.8	178	327	683
3	Nickel	0.172	18.4	250	40	7.25	229	405	636
4	Nickel	0.172	18.4	250	40	7.25	234.5	398	660
5	18–8	0.125	16.7	250	25	22.7[1]	139[1]	153	532
6	18–8	0.125	16.7	250	25	17.3[1]	124[1]	204	475
7	18–8	0.125	16.7	250	25	19.1[1]	119[1]	184	458
8	18–8	0.125	16.7	250	40	12.4[1]	194[1]	236	547
SERIES B.—225 Lb. of Water Heated From 64 Deg. to 212 Deg. F. and Then Boiled for 10 Min.									
9	Nickel	0.093	8	50	45	5.75	72	308	647
10	Nickel	0.093	8	50	29	5.4	75.5	385	785
11	Nickel	0.093	8	50	40	Bean Sauce	.....	382	.....
12	18–8	0.093	9.14	50	45	7.2[1]	61[1]	246	550
13	18–8	0.093	9.14	50	36	7.3[1]	53.8[1]	260	530
14	18–8	0.093	9.14	50	43	.....	.....	230	460
SERIES C.—175 Lb. of Water Heated From 64 Deg. to 212 Deg. F. and Then Boiled for 10 Min.									
15	18–8	0.109	6.4	....	30	10	21	197	308
16	18–8	0.109	6.4	....	36	8.9	25.5	208	322

[1] Corrected for differences in heat transfer area.



SIMPLE A-B-C ACTION does it. Fed in by operator (right), lengths of sausage are automatically cut (A), bunched in groups of eight (B), and "plungered" into cans (C). Filled cans are seen emerging on conveyor at lower left.

ABOLISHED—
Sausage Canning's "Weak Link"

Old dependence on hand-art is "out" as ingenious unit developed by Kingan engineers boosts speed, sanitation, and precision in can-filling of tender Vienna-type links

LLOYD E. SLATER
Assistant Editor, "Food Engineering"

Climax of efficient operations on the modern food processing line is mechanized filling—which is more productive and sanitary, removes many variables due to the human element, and brings savings in floor space which alone often justify its adoption.

But many food products, because of their traditional shapes and characteristics, have continued to defy such filler mechanization. And thus the artful hand has often remained as a weak link in otherwise well-engineered lines.

Typical of the problem—now solved at Kingan & Co., Indianapolis—is the canning of Vienna Sausages. These diminutive links are quite tender and malleable in the precook stage. Yet they must be guided into the small containers, in which they are sterilized, with little distortion or pressure—for the consumer demands cylindrical perfection on his plate.

Kingan, in its rapid drive toward mechanization, recognized that first-rate engineering was required to solve this poser, and—as with the "Inject-O-Cure" and other innovations it has sponsored—spent two intense years developing a system to automatically fill Vienna sausages into cans.

Today, the fruit of this labor—a unique, compact machine—is "on-stream" providing the following marked advantages:

- **Much more uniform pack and weight control**
- **Drastically reduced waste in the filling operation**
- **Doubled throughput with less personnel at the station**

Harking back to pre-mechanized days, it is easy to spot the company incentive to develop this new unit. The sausage came to the canning department from the smokehouse in varying casing lengths. The casing was stripped at a table and product fed to several seated operators who hand-cut it into approximately 2½-in. pieces and

stuffed eight of these into 3½-oz. cans.

Not only was this old procedure economically unsound but it called for an inordinate amount of handling to get a uniform fit in each can.

Then, about three years ago, the company's Methods & Standards Department came up with a seemingly "Rube Goldberg" idea of automatically stuffing the product into cans through use of a reducing sausage-carrying chain and plungers.

Dubious, but highly interested, management suggested that a scale model of the device be rigged up before sizable expenditures were made for a full-sized working model. The model then demonstrated the worth of the basic idea, whereupon the go-ahead was given for the intricate developmental work that has led to today's machine.

Fabricating a large capacity unit that would gently handle this delicate product was a tough chore—since very little precedent existed anywhere in industry. But a unique combination of synchronized movement and smooth acting pneumatic plungers solved the problem.

Machine at Work

Essentially, the new machine periodically takes eight 23-in. lengths of skinned sausage, cuts these into eight can-sized batches, and gently stuffs them into a similar number of cans. Filled cans then travel down the line through a Continental Can loose sealer and a vacuum closing machine prior to retorting.

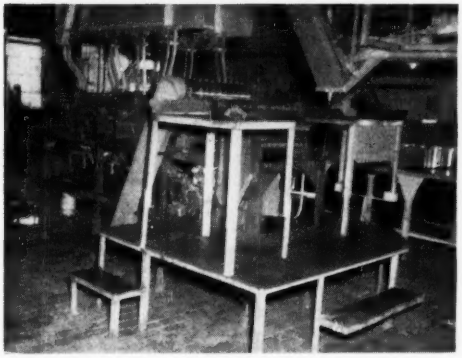
Here's how the operation proceeds: Eight sprocket-chain endless conveyors bearing can-sized stainless steel cups carry the sausage. These conveyors are parallel to each other and of varying lengths.

At the feed-end of the machine, the batch of skinned sausage lengths is laid into each full row of the cups by an operator. As all chains advance together, the cups pass between nine circular Lippert knives which cut the product into can-sized pieces and evenly trim outside-conveyor sausage ends.

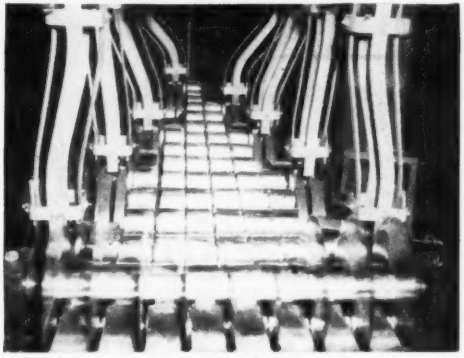
As each cup-bearing chain ends its forward travel (inner ones are progressively longer in travel), an air cylinder plunger pushes the product into a can, which is supplied from an overhead chute and positioned by a can-bearing wheel. There are, of course, eight such plungers and can-supply

(*Turn to page 155*)

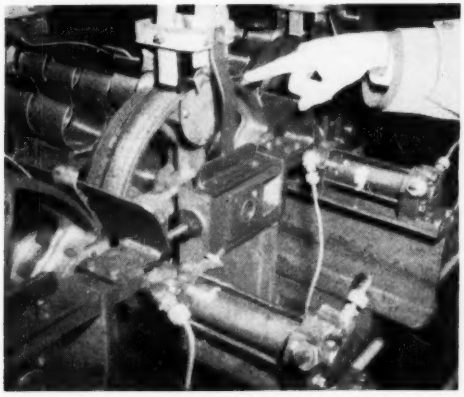
Layout and Details



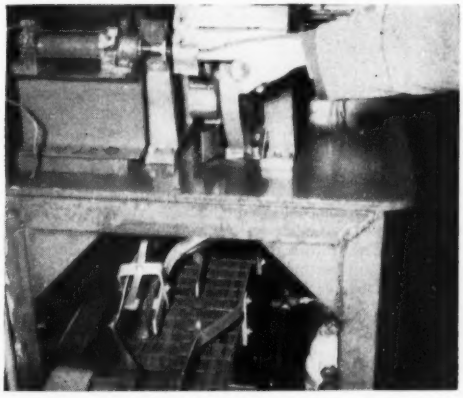
IT TAKES very little space. From platform tables, product goes direct to knives at feed-end. Overhead can sterilizer supplies containers through eight chutes.



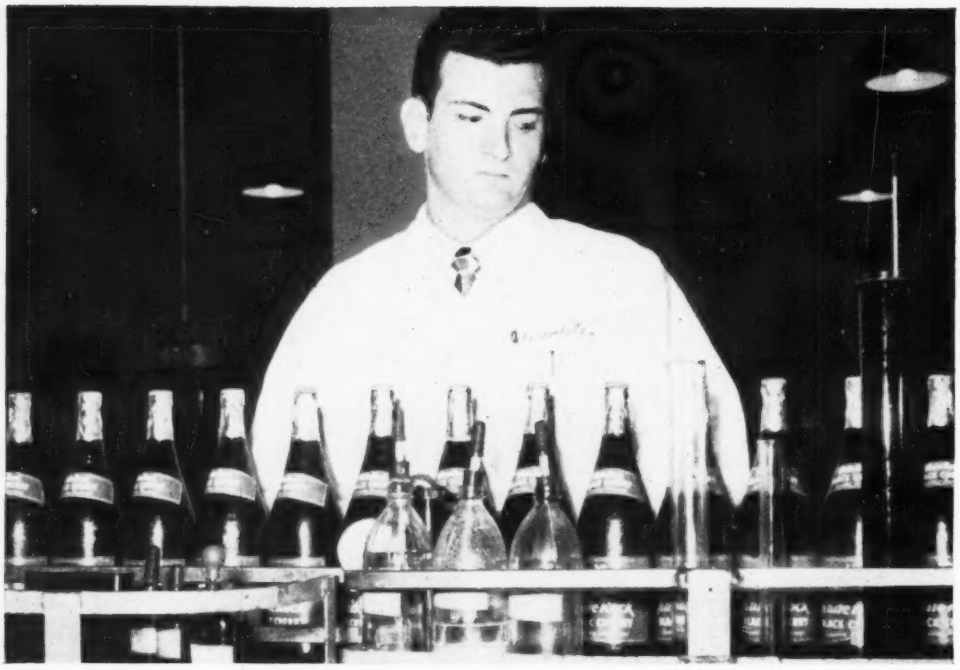
NINE circular knives (foreground) slice 23-in. lengths of product to can-size as row of eight cup conveyors moves to discharge positions at each can chute.



CANS are fed into grooves on counter-clockwise rotating wheel, which then makes a quarter turn to the filling station (left) on each advance of the conveyor.



CLOSEUP of pneumatic plunger that gently pushes sausage from conveyor cup into waiting can. Filled can then chutes to upright position on discharge belt (below).



WITH test equipment handy, Author Insalata is set to check quality of the beverages right on the line.

CO_2 *Versus* Beverage Bacteria

Recent Findings Give Bottlers New Quality "Yardstick"

They confirm that high gas volumes will produce sterility regardless of type of contaminating microorganisms. Brix, pH, incubation time are key factors

NINO F. INSALATA
Chief Bacteriologist, White Rock Corp., Brooklyn

With the aim of improving quality of soft drinks, a new study has been conducted seeking to clarify the action of CO_2 in killing bacteria in the beverages.

▶ **The resultant information is believed to offer a most pertinent guide to bottlers, since it has revealed how certain ingredients and prime factors of processing influence the germicidal effect.**

First, however, a brief word on the role of carbonation:

It is a known fact among soft drink bottlers that the bacterial content of carbonated beverages decreases with age of the drink, until absolute or relative sterility is frequently attained. There are types of microorganisms, however, that are more resistant than others and can sustain themselves under high gas pressures.

Various and vague assumptions have been made as to efficacy of carbonation on bacteria. But in work previously reported, specific factors such as initial bacteria count, temperature of storage, and times between bottling and examination, were not pre-determined.

Therefore, the question has arisen as to what actually produces sterility in carbonated beverages.

Effect of pressure alone was eliminated when experiments with CO_2 and nitrogen showed the former to be more effective against bacteria than the latter.

Samples bottled under N_2 pressures gave approximately identical results as still beverages.

With the carbonated beverages, on the other hand, bacterial content decreased steadily. And in the samples under higher pressures, reductions were most rapid.

Study Undertaken

In the study reported here, which was directed along practical lines, attempts were made to determine what factors in the process of carbonation actually did produce the above-mentioned sterility.

A series of tests were performed on solutions containing:

1. Mixtures of salts employed to give certain flavors to beverages. 2. Sugars. 3. Molds. 4. *E. Coli.* 5. Yeasts.

The Role of Salts

Addition of mineral salts has been known to produce high bacterial counts in beverages when plated for routine tests immediately following bottling. Therefore, these salts must be considered as providing a source of bacterial contamination of the finished product.

A routine run of these salt solutions was made using a gas volume of 5.3, since beverages containing salts are subject to high CO_2 volumes. Original counts showed 125 bacteria per ml. But the counts decreased steadily to 1 within a week, and to absolute sterility in 12 days.

Solutions Containing Sugars

Problems that arise when using sugar solutions are really twofold: (1) the solutions may be used by small populations of bacterial invaders for metabolic purposes, resulting in rapid multiplication with an increase to unsafe proportions, and (2) beverages utilizing syrups are produced under variable gas pressures.

In the first tests, low gas pressure (2.5 volumes) and high sugar content (12 Brix), with a pH of 3.0, were used. Routine sanitary control was maintained during the process, with flash pasteurization of sugar solutions at 180 deg. F.

Three dozen "splits" were removed from the bottling line immediately after crowning and mixing. Samples from six of these were plated on nutrient agar and incubated at 37 deg. C. for 48 hr. Remaining bottles were uncapped and 1 cc. of inoculum, containing 10,000 microorganisms (*E. Coli*) per cc., was introduced into each. Then they were recrowned.

At the end of 48 hr. at room temperature, and each day thereafter, two of the bottles were opened and samples were removed and plated in duplicate. Bacterial flora dropped almost to sterility in 72 hr., and complete sterility was produced in 11 days.

The above experiment was repeated with a higher (4 volumes) gas pressure, a lower sugar (8.5 Brix), and a pH of 2.6. Complete sterility was attained in 10 days.

To determine the effect of carbonation on mold growth, similar experiments were conducted in which mold spores composed the inoculum instead of bacteria. Results indicate that presence of CO_2 under pressure produces an unfavorable environmental condition for molds.

Variable Gas Pressures

To demonstrate the action of sustained carbonation on microorganisms, samples were prepared having all environmental conditions identical and employing varying CO_2 pressures.

Sixty samples were prepared from a sterile sucrose solution to give a Brix of 10.92 deg., and to each was added 50 *E. Coli* organisms. The jars were divided into four groups (15 each) and carbonated with 2.7-3, 3.0-3.5, 3.5-4.0, and 4.0-4.3 volumes CO_2, respectively, then sealed and allowed to incubate at room temperatures.

At the end of 48 hr., and each day thereafter, one bottle from each group was opened and a sample from it plated on both nutrient and Wort's agar. Results (Fig. 1) show that autosterilization occurred first in the sample subjected to the highest gas volume (2 days at 4.0-4.3), and that those samples containing lower volumes of CO_2 did not exert the same immediate effect. Sterility was attained, however in 4 days at 3.5-4.0 volumes, and after 6 days at pressures of 2-2.7 and 3.0-3.5 volumes.

What About Yeasts?

It is known that low gas volumes permit growth of *Saccharomyces Cerevisiae* to such an extent that there are macroscopic, flake-like particles in the bottles, and a distinct yeasty odor of fermenting sucrose.

But what would be the effect of pressures in the neighborhood of 5 volumes?

To answer this question, 24 bottles (7 oz.) of carbonated water with a pressure of 5.1 volumes were opened and each was inoculated with approximately 800 yeast cells. Bottles were recrowned and, when rechecked, found to have a pressure of 5.0 volumes. They were incubated at room temperature, and a sample from one bottle plated each day. At the end of 48 hr., contents of the bottles were sterile.

However, these samples contained no surcrose, which would have acted as a media for the invading yeast cells.

Noting the low pH created by the presence of citric acid, it was revealed that 0.291 percent of the acid did not inhibit growth of heavy inoculations of yeast cells in sucrose solutions.

Therefore, additional experiments were undertaken to reveal the relationship between Brix, carbonation, and pH of a product.

A sufficient quantity of sucrose and citric acid solutions were added to each of 60 "split" bottles to give a finished beverage having a Brix of 12 and a pH of 4.5. (Optimum pH for yeast growth is 4.0-4.5.)

The group was divided into three equal classes (20 bottles each), carbonated to 3, 4, and 5 volumes CO_2 respectively, and inoculated with *S. Cerevisiae* (150 organisms per bottle).

(*Turn to page* 190)

How Gas Pressures Speed Sterilization

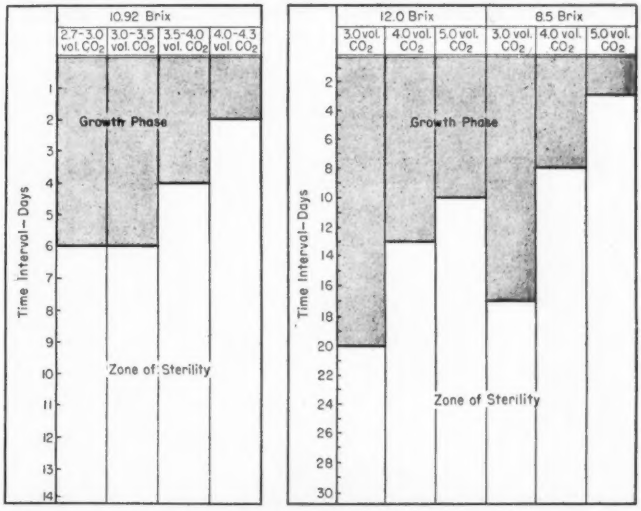
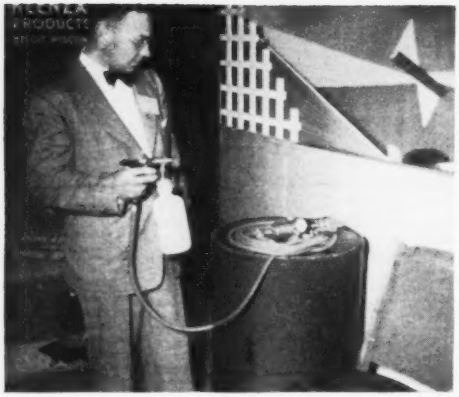


FIG. 1 & 2. Carbonation is effective against both bacteria and yeasts. Left: E. Coli quickly succumbs to high CO_2 pressures. Right: Sugar content of beverage retards kill of S. Cerevisiae.



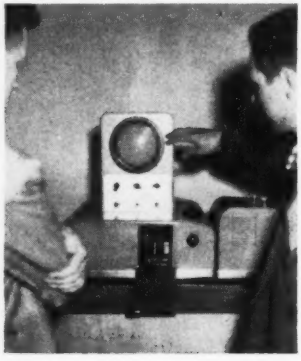
FOG sanitizing unit sprays fine mist of sodium hypochlorite or quaternary ammonium compound into tank trucks, storage tanks, or processing vats. It comes with or without air unit. Maker: Klenzade Products, Inc., Beloit, Wis. (86A)

IFT'ers Inspect

LATEST DEVICES, ACCESSORIES

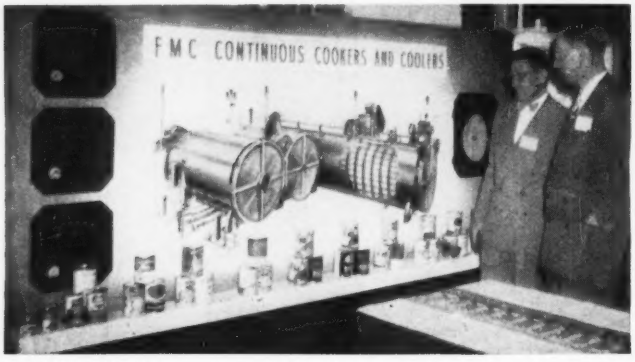
Advanced controlling and checking equipment, also process units and supplies, arrayed at technologists' 12th meeting

THIS INDUSTRIAL low-voltage X-ray unit speeds study of insect development and infestation in grains. Displayer: Picker X-Ray Corp., White Plains, N. Y. (86B)

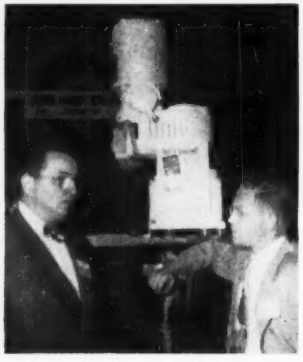


QUICK color changes in transparent solid or liquid samples are indicated electronically by Rapid Scanning Spectrophotometer shown by American Optical Co., Buffalo, N. Y. (86C)

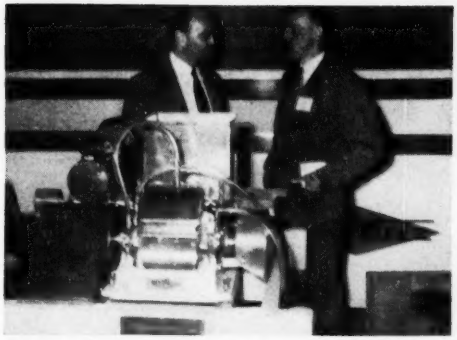
ELECTRONIC DETECTOR spots unclosed bottles, jars, and cans on production lines at up to 600 per min. Maker: W. F. & John Barnes, Rockford, Ill. (86D)



PRECISE CONTROL, a necessary adjunct to successful continuous processing, was **stressed in** cutaway cooker-cooler representation at booth of Food Machinery **&** Chemical Corp., Hoopeston, Ill. (86E)



VARIABLE-SPEED drive affords 4 types of mixing in kettle made by Groen Mfg. Co., Chicago. (86F)



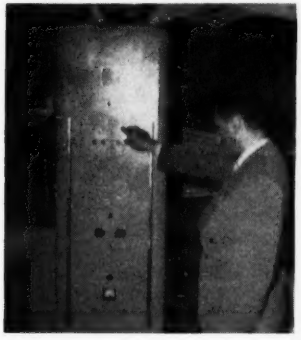
CONTINUOUS proportioning and mixing of liquids and solids is possbile with this unit. It comminutes solids as spray head feeds in liquid. Maker: The W. J. Fitzpatrick Co., Chicago. (87A)

INDUSTRIAL REFRACTOMETERS equipped with special scales for easy and speedy determinations of total solids in liquid food products were shown by Bausch & Lomb Optical Co., Rochester, N. Y. (87B)

GERMICIDAL CLOTH impregnated with enough Roccal to make 2½ gal. of sanitizing solution was featured at the booth of Sterwin Chemicals, Inc., New York City. (87C)

DEOXYGENASE, an enzyme that desugars eggs and removes oxygen from bottled, canned, or packaged foods, was shown by Takamine Laboratory, Inc., Clifton, N. J. (87D)

DETERGENT feed unit employs conductivity controller installed in wash tank to maintain strength of cleaning solution. Maker: The Diversey Corp., Chicago. (87E)



NEW color selector mechanically grades beans, peas, nuts, and grains by electric eye. Displayer Newman's Inc., Tulsa, Okla. (87F)

HALF-SIZE MODEL of Van de Graaff electron accelerator for research in sterilizing foods and drugs was displayed by High Voltage Engineering Corp., Cambridge, Mass. Actual generator produces maximum constant potential of 2 million volts, is manually adjustable from 0.75-2.0 mv. (87G)

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THIS ultra-modern, three-story AIB building is now the scientific and educational capitol of the baking industry.

Bakers' New Technical Center *Builds Tomorrow's Progress*

Its pattern-setting facilities for research, development, testing, and education will solve working problems and train future leaders

FE STAFF

Forward-looking leaders in the bakery field have continually strived to establish an outstanding national facility to form the hub of its numerous development activities.

▶ **Crowning these efforts today is the new American Institute of Baking in Chicago.**

This new center now puts baking in an enviable position among the branches of the food industry in research and in the dissemination of information relative to nutrition and health.

Through the cooperation of over 1,000 individuals and bakeries and allied trades, a modern, functional building has now been erected. Here, efforts are devoted to the advancement of bakery science, to the progress of personnel training, and to the benefit of the consumer.

Money was broadly contributed for the new construction, with donations given for the library, laboratories, classrooms, test kitchen, pilot plant, and bake shops. Equipment valued at about $125,000 was furnished by the Bakery Equipment Manufacturers Assn. Total cost in land, buildings, equipment, and furnishings has run to $1,250,000.

Built of Indiana limestone, and featuring deep window panels, the late-design three-story structure covers an area of 40,000 sq. ft. Occupying the first floor are offices and the school. Space on the second floor is given to test kitchen and additional offices, while the entire third floor houses the laboratories.

Management of the institute is by a board of directors, with specialized activities directed by standing committees.

In a nutshell, the new institute now serves the baking field through its research and service laboratories, sanitation department, baking school, consumer service staff, and library. And each department contributes to the effectiveness of the school.

Now for a detailed account of the facilities of all departments and how they function:

Helps Two Ways

ABI laboratories aid bakeries two ways—directly through service work and indirectly through special research activities. All nine laboratories have been designed and staffed so that this double program can function efficiently. Included are three laboratories for chemical research, and also separate ones for bacteriological experiments, biological and or nutritional studies, analytical tests, Kieldahl determinations, and photographic

work. Included, too, is a pilot plant in which baking is carried out on laboratory-size doughs and on a semi-commercial scale.

Research Laboratory

Nature of the projects undertaken by this laboratory are both basic and practical. Investigations are sponsored by individuals, companies, and by special grants from associations or agencies. No research, however, is conducted on the development of a product or process for an individual company.

Investigation of food-poisoning problems is an example of a project sponsored by general funds of the institute. Development of practical methods of controlling staphylococcus food poisoning in the manufacture of cream and custard-filled bakery products will benefit all bakers.

Studies on the type and quantity of residual sugars in bread exemplifies a project sponsored by an organized group—the Sugar Research Foundation.

Funds provided by the Production & Marketing Administration, USDA, will enable the Institute to seek fundamental information on bread staling. And information so gained is seen leading to methods of retarding deterioration of bakery products.

Experiments conducted on small animals will provide first-hand data on the nutritional value of baked goods, potential toxicity of ingredients offered the bakers, and possible relationship between dental caries and bakery foods.

In the service laboratories raw materials are tested and finished products are examined for individual bakeries or for the entire field. Also evaluated are new materials and processes.

Carried out are analyses varying from simple moisture determinations to complex assays of the enrichment materials, such as thiamine, riboflavin, niacin, and iron. Evaluations are also made of pan cleaners, detergents, wrapping materials, boiler-treatment compounds, and other non-food items used in bakeries.

Service Lab Equipment

These laboratories are equipped with instruments for the physical testing of flours. Included are the farinograph for determining absorption, mixing time, and flour strength; the amylograph for measuring diastatic or malt requirements of bread flours; and the Mac Michael viscosimeter for evaluating soft wheat flours. These instruments provide information valuable in the selection of quality flours and in following conditions required for processing flour to produce top quality baked goods.

The Kjeldahl laboratory, a part of the analytical laboratories, is confined to a special area because of the heat required to run digesting apparatus, muffle furnace, and drying ovens. Moisture, protein, and ash analyses are made in this laboratory for the determination of flour grades and nutritive value of baked goods.

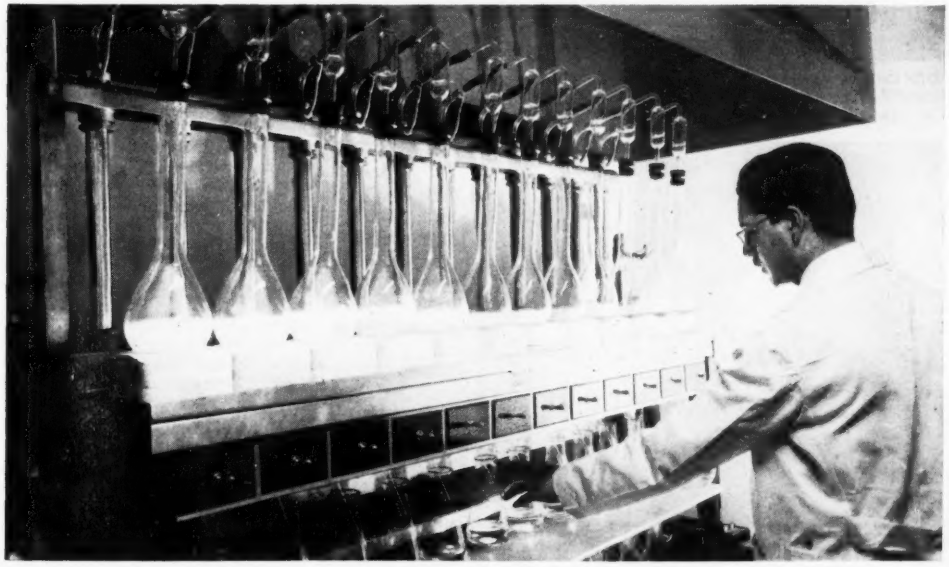
Checking Raw Materials

In the sanitation laboratory, microscopic examinations are made of raw materials and baked foods for possible contamination by extraneous matter.

The AIB's routine checks for raw materials enable bakers to purchase from suppliers ingredients that meet quality standards. And by analyzing flour samples collected from handling equipment as well as baked products, this laboratory is able to detect possible hidden sources of infestation within a plant. Thus, corrective measures can be taken before the infestation becomes serious.

Since flour is the major raw material, analyses of this ingredient, and subsequent baking tests, are significant. The flour is analyzed for ash, protein, and malt level to determine if the miller has met specifications. Baking tests, on the other hand, reveal the best method of handling a shipment to produce top-quality bread. Both the analysis of flour and the baking tests assure the baker of receiving the grade of flour ordered accordingly, and uniform production.

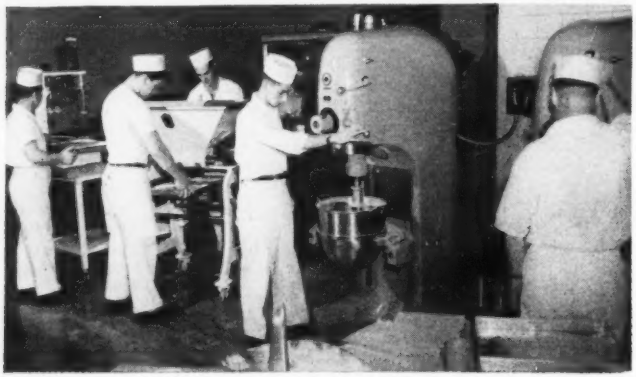
Test baking procedures stimulate commercial operations, processing details being strictly controlled. They differ from commercial-scale production only in that doughs and batters are scaled for 2 lb. of baked items.



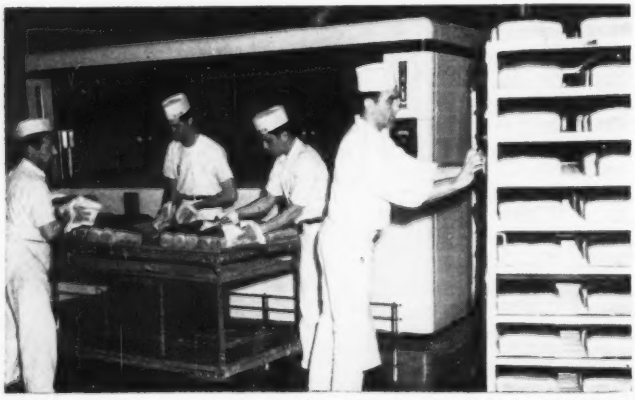
KJELDAHL apparatus in this service laboratory is used to determine protein content of ingredients tested for bakers.

School Teaches the "Why's" and "How's"

IN THIS classroom, students hear lectures relating to baking. Emphasis is on physics and chemistry. Later, application of scientific principles is illustrated by tests in the student laboratory.



WORKING in this well-equipped sweet goods bakery, students get actual commercial production experience on making cakes, pies, and similar items. Shop has full array of late-model machines.



FINALLY, students round out their experience by using facilities of the modern bread shop—commercial-size flour-scale hoppers, mixers, fermenters, dividers, proofers, molder-panner, oven, and slicer-wrappers.

Results of service investigations are immediately reported to bakers, who are charged a minimum fee. These reports serve as guides for ingredient selection and purchase and efficient processing.

Pilot Bakery

While test baking gives useful and valuable information, it is also necessary to check these results on larger scale operations. For this purpose, production is carried out on a semi-commercial scale in the pilot bakery under laboratory control.

This plant is equipped to handle bread doughs comprising up to ¼ bbl. of flour. Employed is a mixer, fermenter for six 70-lb. dough troughs, divider, rounder, preliminary proofer, molder-panner, four-rack proof box, and reel oven. Fermenter and proof box are equipped with automatic humidity and temperature controls.

Cake batters up to 40 qt. are prepared in vertical type mixers, deposited into pans, and then baked in a reel oven.

The pilot plant is available to the service and research laboratories as well as to members in the baking field. It has been used by members for carrying out investigations on the use of fungal enzymes, softeners, and other ingredients in bakery products. Members come to the pilot plant with their own personnel, or they can hire the services of ABI technicians.

Sanitation Department

A second benefit is provided through the facilities of the sanitation department, which was established with a two-fold program:

First, an appraisal inspection on an annual or semi-annual basis is furnished those bakeries wishing to be informed if they are meeting sanitary requirements. Responsibility for a sanitation program rests with the bakery, which uses the services on an appraisal basis, with the Institute acting in an advisory capacity.

Second, periodic inspections are made to determine the sanitary condition of bakeries. At the same time, employees in these plants are taught all aspects of bakery sanitation. After these bakeries have attained a high level of sanitation, they are inspected less frequently.

Employed in this department are a director and nine sanitarians—including chemists, biologists, bacteriologists, and entomologists. These technicians inspect about 350 bakeries from one to four times annually.

Special courses in bakery sanitation are given periodically by this depart-

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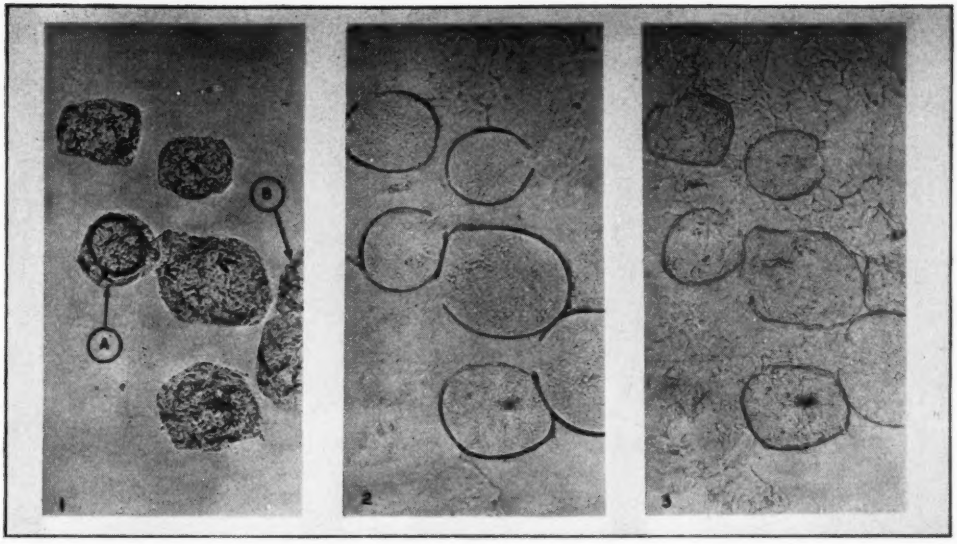


MICRO-VIEWS tell inside story. Fig. 1 shows cells of good quality mashed potatoes. Size can be judged by cell (A), which is about 0.10 to 0.13 mm. in dia. Cell (B) was first to burst in pressure test. In Fig. 2, cells are seen breaking under pressure put on slide, and Fig. 3 shows pressure released, leaving ruptured cells that result in pasty food.

Cell-Rupture Closeups Aid Development of

Better Dehydrated Potatoes

RAYMOND C. HALL

Chemical Engineering Department,
Kansas State College, Manhattan, Kan.

A key problem was faced in the development of precooked dehydrated potato granules—one of the more recent foods for the time-conscious, efficiency-minded American housewife:

How best could this food be formed so that it would rehydrate to a product having the same consistency as freshly cooked and mashed potatoes?

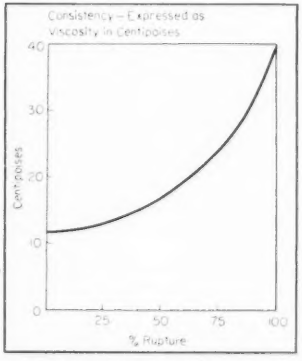
It was known that the potato is made up of tiny cells, and it has been found that if many—perhaps 15 to 20 percent—of them are broken, material having a pasty and gluey consistency results upon rehydration.

And the average American taste is neither accustomed to nor receptive to such a pasty consistency in potatoes.

But first, a brief perspective:

The introduction of the granular food is a logical follow-up of special developments during World War II to meet the armed forces' call for a product satisfying these needs:

1. Reduced shipping volume and weight.
2. Simplified storage in tropical or arctic conditions.



THE LESS RUPTURE, the better the potatoes. This typical curve was obtained by measuring viscosity of a slurry of rehydrated potato granules (with an excess of water).

3. Easiest and quickest kitchen preparation.
4. A resultant tasty and palatable food stuff.

Of course, reduction in shipping costs and simplification of storage are factors which are also important to the domestic processor and distributor. And the minimum effort required for kitchen preparation appeals to the housewife as well as to managers of institutional and commercial kitchens.

Down to Cell Facts

Today, results of studies on mechanisms of cell rupture and on methods for its prevention form the basis for current work in Kansas State College's Department of Chemical Engineering, which is seeking new approaches to various dehydration processing problems.

The potato cells have irregular shapes which tend to be like spheres or rectangles. They vary considerably in size, with an approximate diameter

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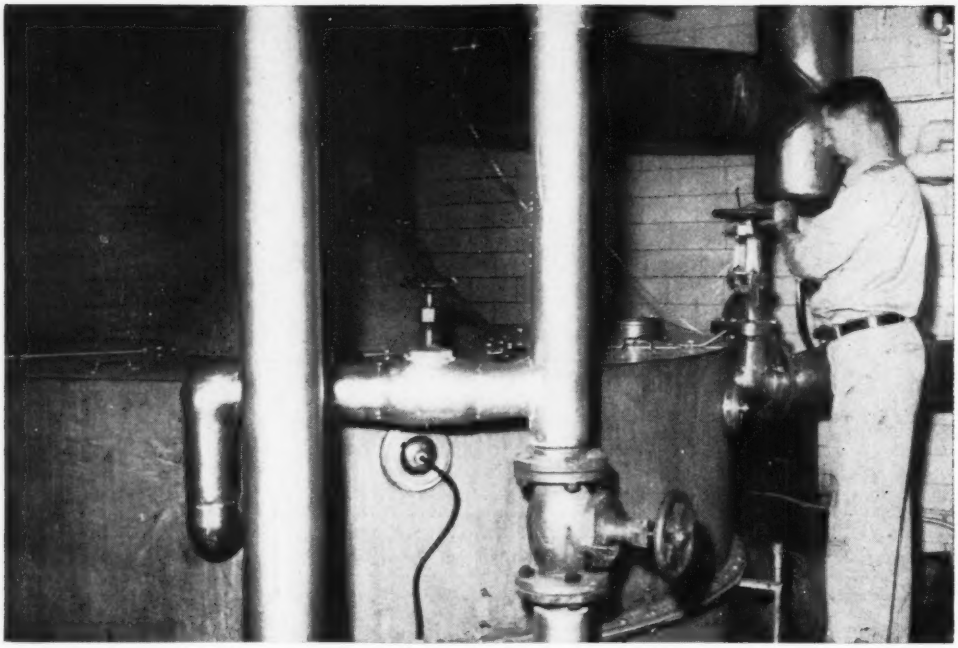


HOP-LADEN WORT from kettles is fed to circular strainer through pipeline via valve seen being opened by operator.

Gets BIGGER Output, BETTER Quality With

Rotary Hop Strainer

New compact unit provides maximum screening area in minimum plant space. Permits greater control in sparging. Sanitary features are notable, too

FE STAFF

Improved control of quality, higher yield, and more effective sanitation are gained with installation of a new push-button-operated circular hop strainer at the brewery of C. Schmidt & Son, Inc., Philadelphia.

Named after its inventor, Richard Slama, Chief Engineer for Schmidt, the new unit (U. S. Patent 255, 387) consists of a circular housing in which a rotating table carries strainer plates.

The circular, or rotary principle follows the same basic idea applied earlier by Slama on five pasteurizers at this brewery. All of this special equipment has been fabricated by Welding Engineers, Inc., Norristown, Pa.

The compact, rotary strainer is designed to provide maximum screening area per sq. ft. Also, simplicity of the operation reduces labor costs.

A Look at Components

Approximately 30-in. in height, the housing consists of an inner and outer shell of sheet metal. These are connected by horizontal stiffeners that are integral with the center bearing support.

Slots at the top of the inner shell provide effective venting during strike-out (kettle emptying). Self-supporting, the entire unit is easily mounted on top of hot-wort or receiving tanks.

The outer shell is 8 ft. in dia., the inner 4 ft. This construction creates a 2 ft.-wide annular table area for the plates. The table is divided into twelve sections or strainer plates made of stainless milled-slot screen metal. Total strainer area is approximately 35 sq. ft.

Full assembly—housing, stiffeners, braces, and plates—is of stainless steel. And, all welds are stainless, ground and polished for complete sanitation.

Table Enclosed

Sectional cover plates, also stainless, are used to enclose the table. One of these cover sections is equipped with a 6-in. circular-glass peep hole, permitting observation without opening the unit while it is in operation.

To expedite and permit thorough cleaning, all cover plates are equipped with handles for fast and easy removal. Further, the covers are built to simply lie on riders, and hand-turned latches

lock them in place. No tools are required for this operation, yet a snug, neat-fit cover is attained.

The table rotates on substantial, removable bronze bearings equipped with lines for convenient lubrication from outside. It is driven by a 2-hp. Reliance induction motor via a Philadelphia Gear Works speed reducer. The table turns at the rate of 10 rpm.

Unit Is Lighted

Vapor-proof electric lights are also provided. One of these is mounted on the outer shell directly above the point of entry of the hop-laden hot wort. Material enters through a spreader, which is bolted to the inlet piping coming from the kettles. This spreader's cross-section varies from circular at the pipe end (inlet) to flat-rectangular just above the strainer plates (outlet). This transitional sweep in section design deposits the hot wort in an even, broad layer of material across the full width of the table with a minimum amount of splashing during the transfer.

Midway between the shells, and in elevation just below the top cover plates, is located the sparging-water line. This 2-in. line, equipped with spray heads, extends part way round the table.

To the rear of the spreader is provided an assembly containing a motor-driven rotary brush that sweeps the hops from the table to a discharge hopper. This brush and the component parts are mounted, as a unit, on the outer housing of the strainer.

The entire unit is removable, and the brush proper can be taken out without disturbing the assembly. The brush is driven by roller-chain power transmission from the same motor driving the table proper. Brush wear is overcome by mounting the bearing in adjustable arms.

The hops-disposal conveyor is a double bottom unit. In cross section it is U-shaped. The inner bottom has milled slots similar to the strainer plates on the table. The moving mechanism is a screw or continuous spiral that moves the drained hops to collector trucks.

This discharge conveyor is also encased with removable stainless steel side and top sections, thereby permitting it to be readily and completely exposed for speedy, thorough cleaning.

Strainer In Action

In operation, hot hop-laden wort flows by gravity from the brew kettle to the strainer. Rate of flow is controlled by a valve in the line just prior to entry into the strainer. The table is put into motion via a pushbutton, which is located in the same vicinity as the valve. This arrangement effects easy, one-station control. Speed of the rotating table is coordinated with the valve opening controlling the flow from the kettle. Here, this relationship of the two has been standardized.

Incoming hot wort is distributed by the spreader over the entire width of the plate. During strike-out, the wort flows continuously onto the table. Here, the wort drains through the milled screen slots, while the hops are retained on the top. Room for incoming wort is made available as the rotating table continuously moves the hops away from the spreader.

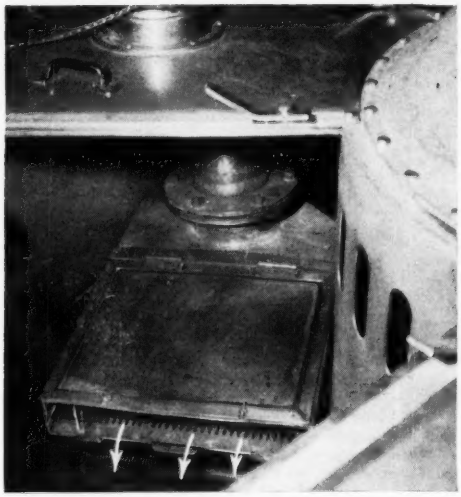
Water Is Metered

Proper timing is allowed for the wort to drain. Sparging water is sprayed over the hops during their travel. These hops are washed to a pre-determined extent by a metered flow of water from the sparger line. Buffalo Meter Co. units record the number of bbls. per brew.

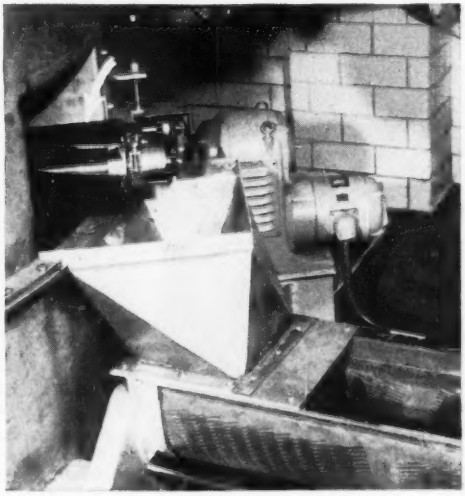
After passing the top spargers, liquid on the hops continues to drain until the hops reach the rotating brush. Here, the hops are swept off the table into a chute feeding the disposal conveyor. The table continues to rotate, a clean screening surface being constantly provided for the incoming wort from the kettle.

This method of straining permits faster emptying of the kettle. And the thin layer of hops on a constantly cleaned surface results in more thorough drainage. It also gives the brewmaster greater control in sparging, thus providing closer control of quality.

Where wort goes in . . . **. . . and hops come out**



EFFICIENT new spreader transfers hot wort to perforated plates with minimum splashing. Arrows indicate flow.

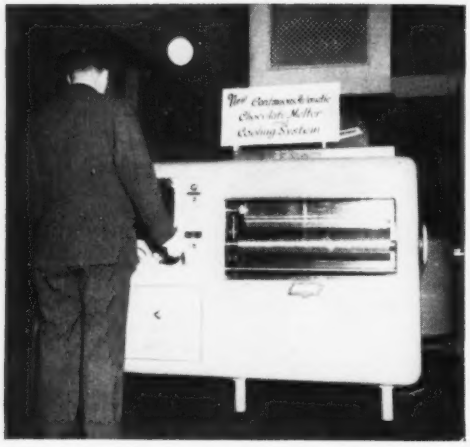


AT END OF RUN, brush (arrow) sweeps drained hops from table into hopper feeding discharge conveyor.

1 Dozen New Candy Units

Here Are Outstanding Chocolate and Hard Goods Machines, Materials Handlers, Latest Proportioner, Mixer, and Wrapper That "Lured Lookers" at NCA Show

Specially Designed Chocolate Units

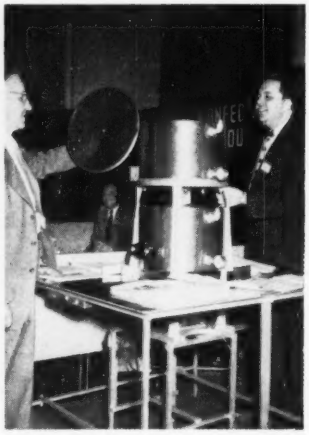


CONTINUOUS chocolate melting and cooling unit that eliminates melting and holding kettles was exhibited by J. W. Greer Co., Cambridge, Mass. Compact machine features a melting roll and completely controlled heat-exchanger. (94A)

AUTOMATIC chocolate tempering unit handles 3,000 lb. hourly. Machine consists of hopper, three heating zones, and return pipe. Jacketed zones and pipe have remote temperature controllers. Maker: W. Rasch, Cologne, Germany. (94B)

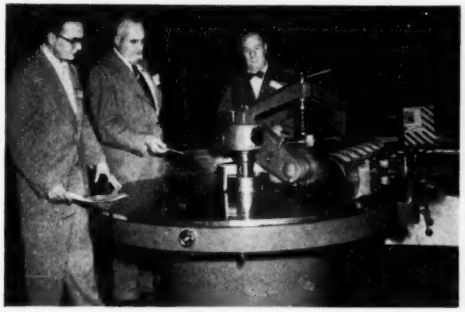
PORTABLE chocolate dipper, run by one girl, uses device that loads 100 centers at a time. Equipment includes bottomer, conveyor, attachable decorator. Displayer: International Research Lab., Pt. Pleasant, N. J. (94C)

SMALL CANDY and chocolate depositor is for little plants. Unit deposits, through three orifices, 180 pieces per minute onto a moving belt. Machine was displayed by Vacuum Candy Machinery Co., N. Y. C. (94D)

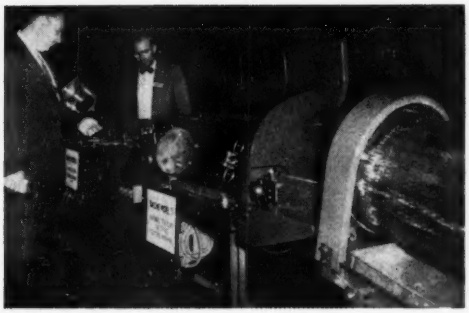


COMBINATION melting and tempering unit and dipping table was exhibited by R. E. Savage Co., Chicago. Jacketed, ticred kettles are equipped with vertical agitators. Unit speeds hand-dipping. (94E)

Advanced Hard-Candy Machines

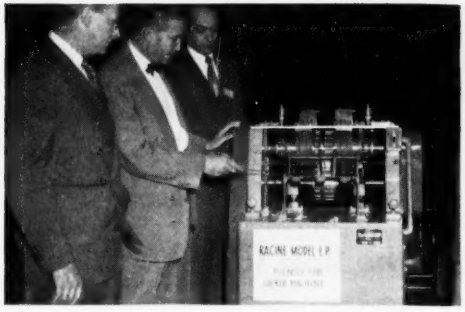


KNEADING and mixing unit handles 125-lb. sucker batch from cooker. Machine consists of round, water-cooled slab and kneading roll, as well as plow-shaped blade. Manufacturer: Carle & Muntanari Co., S/A, Milan, Italy. (95A)



HOOKED UP to automatic candy-stick line, comprising batch roller, sizers, cutter, and cooling conveyor, is fully automatic twister. New unit picks up rope and twists stripes around it.—Vacuum Candy Mach. Co., N. Y. C. (95B)

New Handlers, Pop Units



HIGH-SPEED, plunger-action machine turns out 800 pops per min. Unit automatically die-forms suckers, and plunger device inserts paper or wooden sticks into center of pops. Exhibitor: Vacuum Candy Mach. Co., N. Y. C. (95C)

STOCK-BOX packing unit, displayed by J. W. Greer Co., Cambridge, Mass., requires only two instead of six girls. Unit consists of concave vibrating belt that takes chocolates from cooler conveyor and feeds them onto cards. (95D)

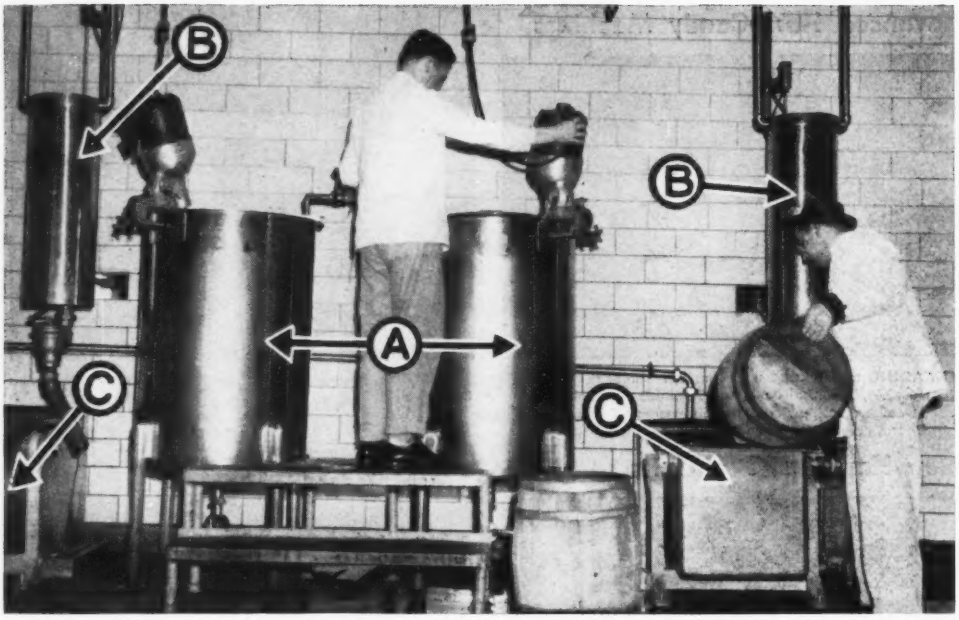
Speedy Proportioner, Mixer, Wrapper

ROBO-LIFT proportioning conveyor, shown by Counsel Machine Co., Wallington, N. J., feeds any number of different flavored candies from hoppers into interlocking bucket conveyor. (95E)

CONTINUOUS Oakes marshmallow mixer features variable speed controls for pump and rotor drive, also cut-off switch that shuts off pump when pressure exceeds 70 psi. Maker: E. T. Oakes Corp., Islip, N. Y. (95F)

THIS new lollypop wrapper turns out 180 pops per min. It has speed regulator that can be adjusted for handling 100 pops per min. Unit includes improved feeder.—Wrap-Ade Machine Co., Belleville, N. J. (95G)

Want additional information about any of the items shown in this picture article? Just circle the key number (in parentheses at end of each caption) on the Reader Service coupon adjacent to inside back cover. Then drop it in the mail—and complete data will be sent you directly



TO FACILITATE handling of ingredients, First National installed mixing tanks (A) which prepare fruit-acid and pectin solutions and feed them to cooking area; automatic batch hoppers (B) for measuring juices into kettles; and special remotely controlled dump bins (C) for batching fruits into cooking kettles on floor below.

Engineering Takes the Bow for

Big *UP* in Output and Uniformity

By constantly improving handling of ingredients, cooking, cooling, and packaging, alert processor boosts production and quality on straight-through jam and jelly line

JOHN V. ZIEMBA
Assistant Editor, "Food Engineering"

Today, better jams and jellies are coming off the line faster at First National Stores, Inc., in Somerville, Mass.

This progress is credited to installation of advanced bulk-handling units and new labor-saving processing equipment.

Engineering was stressed by the company's process planners. And two things were uppermost in their minds when they went about modernizing the department. First, they sought top-efficient equipment and processing techniques to expand the jam and jelly production facilities. Second, they aimed for achievement of the higher performance without sacrifice of established product excellence.

In all, eleven significant process changes have been made by the company to increase productivity in its manufacture of quality jams, jellies, and preserves:

1. Receiving, storing, weighing, scaling, and feeding of sugar into cooking kettles have now been fully mechanized.

2. A combination aluminum-insulated freezer-storage and tempering room has eliminated clutter of materials on the ingredient-preparation floor.

3. Frozen juices are continuously defrosted, blended, and batched into cooking kettles (for jellies).

4. Special, remotely controlled dump bins now simplify the job of feeding fruit and pulp into kettles (for jams and preserves).

5. A continuous line has been set up for defrosting, finishing, and dumping pulp into kettles (for seedless jams).

6. Facilities for preparation and delivery of fruit acid and pectin solution to cooking station have simplified the handling of these minor ingredients.

7. Flow meters installed at the cooking station enable attendants to deliver accurate measurements of water into kettles when preparing mint jelly and table syrups.

8. Temperature controllers are employed to terminate batch cooks at the finish points automatically.

9. A high-and-low liquid-level system, hooked up with signal lights, is

used for discharging batches from kettles to the hopper of the filling machine.

10. A special vacuum-concentrating system has been installed for the preparation of whole-fruit preserves without mashing of product.

11. Operations of machines from unscrambler to continuous cooler are controlled by pushbuttons on a panel at the filling station.

We will take up each of these eleven strides in turn:

1—Bulk-Sugar Handling

New handling efficiency has been attained through a speedy automatic method of storing, weighing, and then dumping sugar into cooking kettles. Let us describe the steps from the beginning:

Hauled in bin-type, dump-body trucks, sugar is discharged into a horizontal spiral conveyor, which delivers it into a twelve-section, metal storage bin located in the basement. Capacity of the bin is 40,000 lb.

Each bin section has a bottom hopper with a quick-action slide gate for feeding sugar into a floor-level, horizontal spiral conveyor. A bucket elevator then carries the sugar to the fourth-floor weighing station. Here, another horizontal screw conveyor discharges the sugar into a 1,000 lb.-capacity supply bin.

Filling of this bin is simplified by an automatic level-indicating system. When full, a rubber diaphragm set flush with the inside wall actuates a limit switch. Acting as a safety device, this switch stops the conveyors. Refilling of the empty bin then starts automatically.

Multi-Product Line Layout

—of First National's highly efficient units for processing jams, jellies, and preserves is shown in graphic detail in this month's special FE Foldout Picture-Flowsheet—on pages 136-139.

Both weighing and feeding of the scaled sugar into the cooking kettles are automatic. Flow is from the 1,000-lb. supply bin to vibrating chute, scale hopper, horizontal screw conveyor, feed bins, discharge pipe, and kettles. There are four 250-lb. feed bins supplying eight 100-gal. kettles on the floor below.

By pressing a pushbutton in front of a kettle, a slide gate at the bottom of the supply hopper is opened and sugar flows through the vibrating chute and into the scale hopper. Flow into the latter automatically stops when the weight reaches a predetermined setting. Scale discharge into the scroll conveyor for delivery to the proper kettle-feeding bin is also automatic.

Green lights come on in front of the kettles when feed bins are full. Red lights indicate empty bins. Scaled sugar is dumped into a kettle by moving a lever that releases an air-operated slide gate at the bottom of the feed bin.

2—Aluminum-Insulated Storage

By installing a combination freezer-storage and tempering room, cluttering of barreled and canned frozen fruits and juices is eliminated on the ingredient-preparation floor. Frozen fruits and juices are stored at −10 deg. F. in a 40x60-ft. freezer and tempered, as needed, in an adjacent 40 to 45 deg. F. (20x60-ft.) room. Walls and ceilings of both rooms are insulated with Alumiseal reflective insulation.

3—Continuous Juice Line

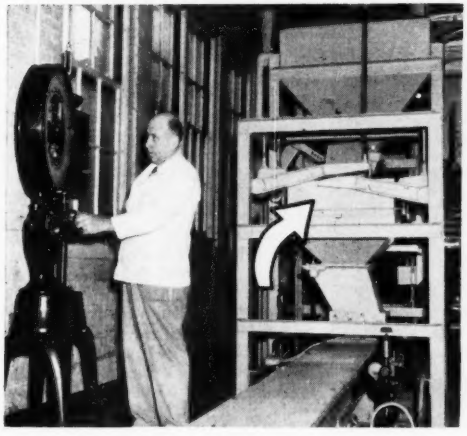
An outstanding improvement for boosting productivity on the jelly line has been the installation of a continuous juice preparing and batching system. Designed according to First National's specifications, this new system is employed for screening, blending, and batch-scaling of fruit juices into cooking kettles.

Let us follow the steps in preparing and feeding the juice into kettles: Lift trucks haul 5-gal. cans or 500-lb. barrels of juice from tempering room to two stainless steel, steam-jacketed kettles, holding 100 and 150 gal. Steam is turned on and the juice is gravity-fed into a small stainless surge tank equipped with a 45-mesh screen. Screened juice is next pumped into a 250-gal., stainless blending tank, where it is recirculated.

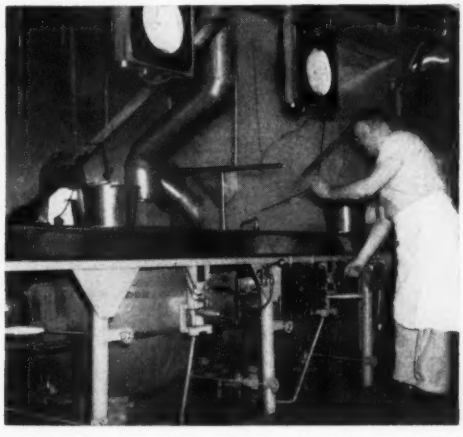
Automatic batching into cooking kettles is next. From the blending tank, the juice is pumped into three stainless batch hoppers. Mechanical feeding of each batch of juice into kettles is accomplished by a Photoswitch liquid-control system.

Here's how the high and low liquid-level probe rods inside each hopper work: When juice coming from the blending tank reaches the high-level probe in the hopper, a solenoid trips a feed valve and the juice is then recirculated in the blending tank. By

Sugar Handling Is Mechanized

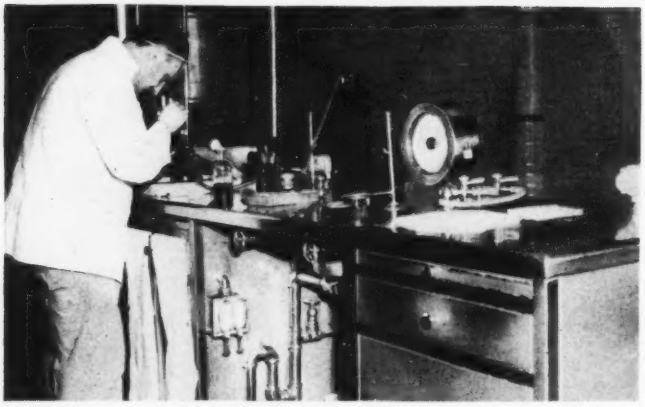


OPERATOR sets scale, then sugar is conveyed from basement-storage bins to scale hopper (arrow).

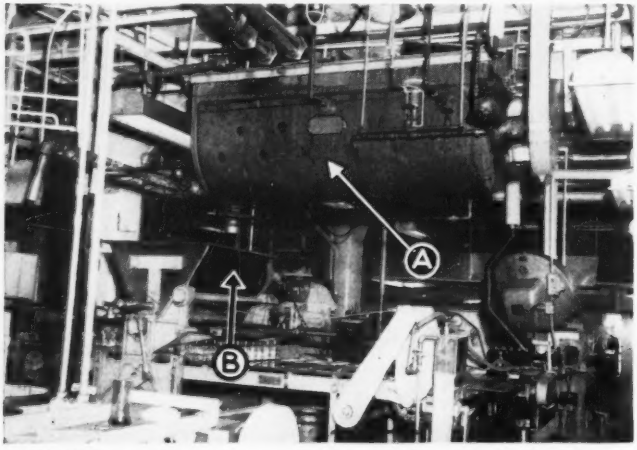


ATTENDANT in cooking department charges scalded sugar into kettles. Note automatic temperature controllers.

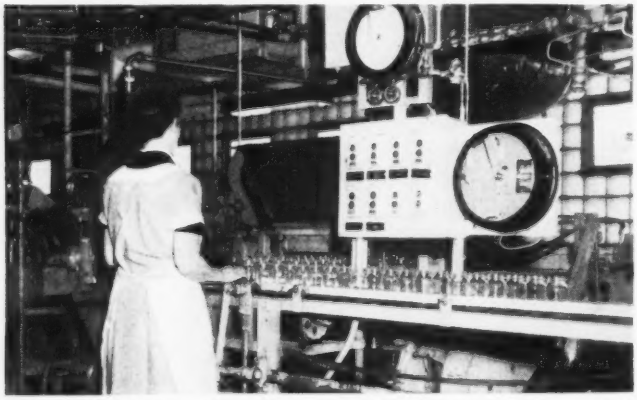
Checking, Cooling, and Packaging



CHEMIST checks soluble-solids content of each batch before it is emptied from cooking kettles. Note barometer on work table.



PRESERVES go through company-designed continuous cooler (A). Unit is cold-water jacketed. Cooled preserves feed into hopper of filler (B).



OPERATION of all machines, from unscrambler to jar cooler, is controlled by pushbuttons on panel adjacent to filling machine.

operating a pushbutton at the cooking station, juice is now discharged from batch hopper through a pipe and into a kettle. As the juice contacts the low-level probe, the solenoid automatically opens the feed valve and closes the hopper-discharge valve. Juice then rises in the batch hopper until it reaches the top-level probe, thus completing the cycle.

4—Dumping Fruit

Discharging fruit into cooking kettles is another job that has been improved. Employed are four company-designed, stainless steel dump bins. Of 400-lb. capacity, these bins are located on the floor above the cooking kettles. They are equipped with hydraulically operated dumping devices that are remotely controlled.

Fruit is fed into kettles in this manner: First, it is weighed and loaded into a bin. Next a lever adjacent to the kettle is pulled and the hydraulic mechanism tilts the bin. Fruit then drops into a swivel-type chute, which can be directed into either of two kettles.

5—Preparing Pulp

Continuous handling of pulp for the manufacture of seedless jams is another efficiency-promoting measure adopted by the company. Partially tempered fruit pulp is defrosted in the two juice-thawing tanks, previously mentioned, then pumped through the finishing machine that removes seeds and skins. Pulp is then pumped to the four dump hoppers, where it is automatically discharged into cooking kettles in the same manner as fruit.

6—Batching Acid and Pectin

Further efficiencies have been achieved in preparing and scaling acid and pectin. Fruit acid (citric) is made up in the ingredient room. Employed is a 25-gal. stainless tank, with a Lightning agitator, for mixing the acid into solution. This solution is then piped to the cooking room on the floor below, where measured amounts are drawn off in graduated stainless steel cylinders. Acid is added to each batch of jam or jelly to bring the pH to the optimum figure for gel formation.

Liquid pectin, also prepared in the fourth-floor ingredient room, is piped directly to the cooking floor. Here, it is batch-weighed into a stainless container set on a scale. Flanking the scale are two banks of cooking kettles—four kettles to a bank.

In preparing the pectin solution, water is first metered into two stain-

less steel tanks, each equipped with a vertical, propeller-type agitator. A weighed amount of pectin is then blended into the solution.

An inter-department communicating system is hooked up between the fourth-floor ingredient preparing, third-floor cooking, and second-floor packing operations to speed production performance.

7—Metering Water

Quick, accurate measurement of water into cooking kettles is now possible through the installation of flow meters. When an operator is ready to prepare a mint jelly or a table syrup with maple base, all he needs to do is set a meter and open a valve to get the proper amounts.

8—Cooking Controlled

Batch-finishing points are either automatically or manually controlled. Automatic cooking is accomplished with temperature controllers hooked up to thermocouples suspended into kettles. These instruments are also provided with temperature recorders.

(Turn to page 153)

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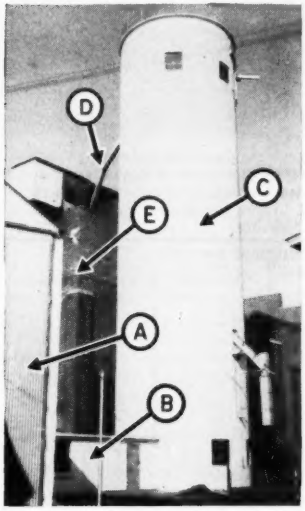
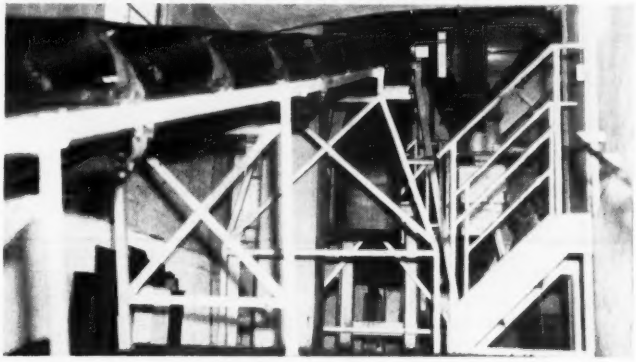




HOW SYSTEM OPERATES. Left photo: Coal is dumped from gondola in enclosure (A) and belt-conveyed via narrow passage (B) to 500-ton silo (C). Chute (D) feeds coal, elevated from bottom of silo, to plant's boiler room (E). Photo above: Troughed-belt conveyor carrying coal through shed to silo (rear). Chutes seen at bottom of silo withdraw coal to a main chute serving bucket elevator, which then lifts fuel to chute feeding to boiler room.

They Get Cleanliness-Plus

Problem Was *Dust* . . . Solution: *Mechanized Handling*

FE STAFF

Three distinct benefits—better sanitation, higher efficiency with less labor, and greater flexibility—have been gained by The Nestle Co., Inc., through installation of a completely mechanized, enclosed coal dumping, storing, and feeding system at its Fulton, N. Y., chocolate plant.

Here, some 50 tons of coal were required for daily operations.

But there was a problem: Storing of coal in exposed loose piles in an area adjacent to the plant made for dustiness around the plant. This meant a constant need for cleaning to keep conditions under control.

But no longer. Today, the fuel is efficiently being handled in the following manner:

Unloaded from a gondola car directly into a hopper within the unloading enclosure, the coal goes by inclined, troughed-belt conveyor via a long connecting passage to the bottom of the silo.

All the units are specially designed to protect both the inside and outside of the plant from coal dust siftings. The white-painted silo is of 24 ft. dia., stands 90 ft. high, and has a capacity of 500 tons.

From the bottom of the silo, a bucket elevator lifts the incoming coal to the top of the silo storage pile. Then when needed, coal is discharged from the bottom of the unit by five chutes that in turn empty into a main chute feeding the same bucket elevator. This time, the elevator discharges the fuel into an outgoing chute up top that supplies a 175-ton bunker in the boiler room. The coal is withdrawn from this bunker by means of a weigh-lorry that delivers it directly to the plant's boilers.

In this way, new efficiency has been attained through speedy, mechanized handling of the coal—dumping, conveying, storing, and feeding it to the boilers.

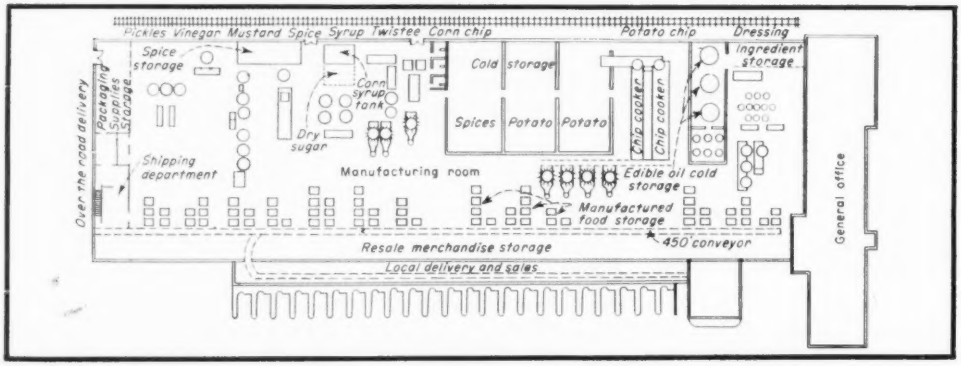
Flexibility as a measure against emergencies has been provided through installation of a special chute about one-third the distance up the silo (see photo). By means of this chute, excess coal may be loaded into trucks for hauling to an auxiliary pile kept a good distance from the plant and thus not constituting a dust hazard.

By employing a Caterpillar to tight-pack the latter pile, combustion is prevented and fine coal dust is kept from blowing about.

New Processing Plant . . . And How It's Laid Out

BRAND NEW, single-story plant of Morton Foods, Dallas, Tex., occupies 75,000 sq. ft. of floor space. Structure was deliberately over-sized to accommodate additional production lines as needs arise.

BLUEPRINT view of plant layout shows nine production lines in the 150x500-ft. manufacturing area. Turned out are pickles, vinegar, mustard, spices, syrups, corn chips, potato chips, and dressing products.



Advanced Practices Gear Plant For Multi-Product Output

Using the most modern equipment and process methods on its nine production lines, Texas processor achieves smooth, straight-through flow of its foods

O. C. TURNER
Vice-President, Morton Foods, Dallas, Tex.

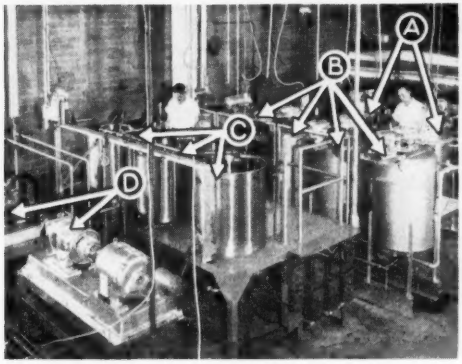
Extreme flexibility, efficiency, and capacity to carry out many food-processing operations under one-roof—and on the same level—were the major objectives in the design of our new Morton Foods' plant at Dallas.

Targeted in the "drawing-board" planning were: (1) Adequate space for swift expansion of any of the production divisions; (2) smooth, uninterrupted flow of raw materials at the right side of the building to the finished products at the left; (3) installation of improved equipment to increase production efficiency and advance product quality; and (4) one-level production under a single roof.

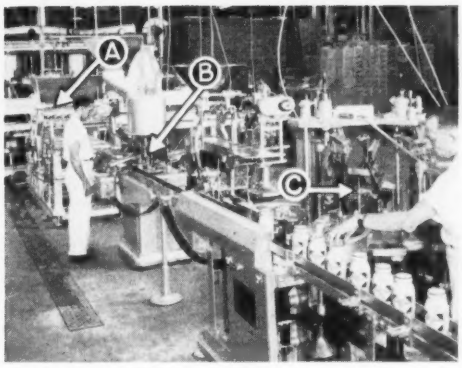
Our operations involve approximately 200 specialty food products, in 15 major divisions. Most of the materials handled are bought in bulk lots, partially processed, and repacked largely for institutional trade.

To take care of future expansion possibilities, we purchased approximately 12 acres, extending to a depth of 1,100 ft. Arranged in this space are the main and accessory buildings; garage and gas, grease, and wash-racks facilities; individual-loading stalls

Photo Highlights of Dressing Line



IN SALAD DRESSING department, starch and vinegar are cooked in kettles (A) and cooled in tanks (B). Oil and eggs are added to starch base in blenders (C). Product then passes through colloid mills (D).



FINISHED DRESSING PRODUCTS are pumped to automatic filling machine (A). Filled jars then go to capper (B) and labeling unit (C). Jars are finally packed into cases for shipment. Speed of line: 120 pints per min.

for 25 city delivery trucks; dock frontage for 15 highway trailers; and off-street passenger-car parking. To facilitate flow of trucks and automobiles, 3 acres have been concreted and a roadway paved. In addition, a 600 ft. railroad spur was built.

Construction of Building

Dimensions of our main structure were deliberately "over-sized" to accommodate additional production and packaging lines as the need arises. The 75,000 sq. ft. of floor space is kept as completely open as the design will permit. Measuring 500x150 ft., this building has a structural steel frame, glazed tile walls over masonry, a corrugated steel roof deck, and dock-high floor slabbing.

To facilitate cleaning, all interior sections—walls, a number of storage rooms, and walk-in coolers—are surfaced with sanitary glazed tile. Tile walls extend 14 ft. to the ceiling rafters.

The slab concrete floors have been coated with pore-sealing Lapidolith—a powder for augmenting the hardness of the floors. Consequently, these surfaces take on a dark, satiny finish after they are scoured and polished. In brief, the plant interior is designed so it can be "cleaned with a fire hose" without damage.

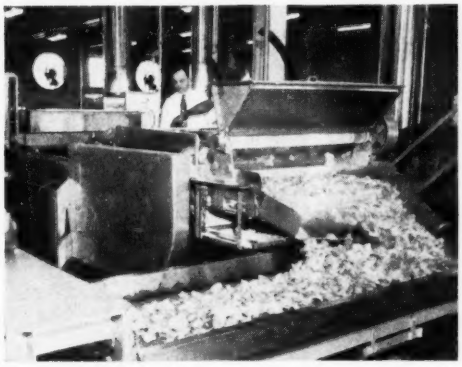
Ventilation is provided through installation of 26 52-in.-dia. exhaust fans, which are lined along one wall of the building. Air drawn from a row of steel-screened windows along the opposite wall whirls away odors, dust, and other particles. The plant is heated by 20 infra-red gas units. Flames enclosed in these units throw a clean flow of heat over the floor.

Production Layout

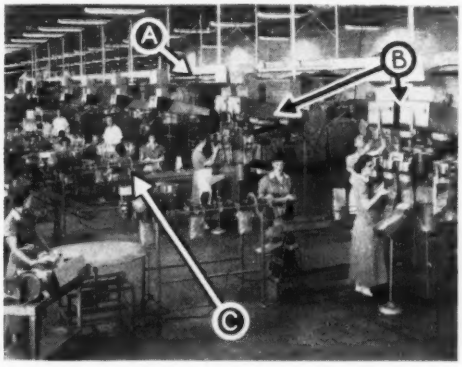
The plant building is divided into nine large bays, each actually the area around a specific production line. The entire production area is, to all practical purposes, split into three 50-ft.-wide strips extending the 500-ft. length of the building.

Raw materials enter the right side

Frying and Packaging Potato Chips



CONTINUOUS fryer is heated by four 4-in. dia. tubes that run full length of cooking area. They burn gas at high pressure. Technic eliminates carmelization of chips.



ON THIS packaging line, 21,000 bags of chips are packed daily. Conveyor (A) feeds chips from salter to hoppers (B) of filling units. Bags are sealed (C).

of the building via a railway spur dock. From here, they go directly to the head of production lines, then move through them to packaging areas, which are close to the center of the building.

After products are packaged, inspected, and cartoned, they are transferred to a 450-ft. electric conveyor, which whisks the collective output of the lines to a truck-service dock at the rear of the building.

Production moves the shortest possible distance, laterally across the plant from one wall to another.

Stainless steel was specified for the production equipment, so far as was practicable in the face of shortages. And the units are widely spaced.

8 Lines Running

Successive production lines, beginning at the right-front of the building and extending to the rear, include those for: (1) Preparing salad dressing sandwich spreads, mayonnaise, and French dressing; (2) frying potato chips (two lines); (3) making regular and cheese-flavored corn chips; (4) cooking and bottling syrup; (5) packaging spices; (6) manufacturing mustard; (7) bottling vinegar; and (8) packing pickles.

Some lines serve a dual purpose. For example, olives and pickles are packed on one line.

Many advanced food engineering techniques have been developed in our plant. Of particular importance has been the refrigeration of ingredient-storage rooms—a practice which was given little thought in a prior location. Two huge tile-walled, walk-in 70-deg. F. coolers provide tank storage for 132,000 lb. of edible oil.

DON'T SKIP IT IF—

You have problems involving:

Plant Layout
Building Construction
Production-Line Layout
Refrigeration of Raw Materials
Continuous Frying
Automatic Bagging

For this article reveals advanced practices that may be useful in your branch of the industry.

Adjacent to this facility, there is a slightly smaller tile-walled refrigerated room in which salad oils are kept at 45 deg. F. Each room has its individual refrigeration unit to maintain the desired temperatures.

Temperatures in the two 50x75-ft. potato storage rooms are kept at 70-75 deg. F. throughout the winter months. A 50x75-ft. spice room is maintained at 55 deg. F. and 60 percent relative humidity to inhibit insect infestation.

Incidentally, special convenience is achieved by locating the edible oil storage coolers between the salad dressing and potato chip lines.

Preparing Dressing Products

The dressing-products' line features stainless steel equipment almost exclusively. All equipment is mounted on elevated platforms for best sanitation and easy cleaning.

In the manufacture of salad dressing, starch and vinegar are mixed and cooked to a slurry in two stainless units. After cooking, the starch base is rapidly cooled in five stainless steel-jacketed cooling tanks, through which 48-deg.-F. water is pumped from a 45-ton Chrysler Air-Temp shell-and-tube refrigeration unit, mounted nearby.

Oil and eggs are added to the cooked starch-vinegar base as the product is transported to three specially designed stainless mixing tanks. These 107-gal. mixers represent a major advance in salad dressing production. Each has a series of stainless steel "fingers" which provide proper breakdown of the ingredients without "whipping them to death."

After blending, the dressing passes through two colloid mills. Then it goes to automatic filling machines. Capacity of these fillers is 120 pt. per minute, although normal production runs between 80 and 100 pt. per minute. Cartoned directly from the filler, products move to the head of the 450-ft. conveyor for transfer to shipping.

Also produced on this line are mayonnaise and sandwich spread. Mayonnaise contains approximately 80 percent oil, 10 percent eggs, and the balance water, vinegar, and spices. Ingredients are blended, put through the colloid mill, then filled into jars, which are capped and packed into shipping cases.

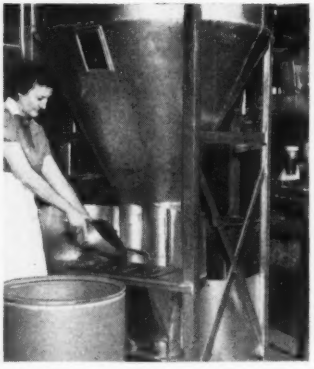
Sandwich spread consists of a salad dressing base, to which is added a vegetable mixture. This product is prepared in the same manner as salad dressing.

Special Chip Lines

We have chalked up important improvements in our potato-chip line. An entirely new method of applying heat to two continuous fryers is featured,

Operations Modernized in Other Departments

COMING out of fryer are cheese-flavored corn chips. They are pneumatically filled into bags.



SPICES are mixed in this blender, which includes two augers rotating at different speeds.

BLENDED MUSTARD goes through mills (A), to mixing tanks (B) for aging, then to filling unit (C).

and we also have installed ten automatic bagging machines which handle 1,100 lb. per hour.

The two potato chip lines, likewise stainless steel, have been improved at every step. Between slicer and cooker, three instead of the usual two washing tanks have been installed to insure better quality products.

Slices are continuously washed in these units as they are carried under high-pressure needle sprays by a 6-ft.-long inclined conveyor. Finally, the slices drop into the cookers.

Continuous Fryers

Major technical improvement on these lines has been the elimination of the former carmelizing of chips falling to the bottom of the frying unit. This was attributed to the application of gas heat from the bottom of the fryers. Both of our newly designed fryers are heated by four 4-in.-dia. tubes that run the full length of the cooking area. Gas is burned within these tubes under high pressure.

Cooking fat in the chip fryers is not agitated, except by the bubbling action of the 325-375-deg.-F. oil. These fryers are equipped with rakes that submerge the chips in the oil and push them forward.

An electronic control is incorporated so that if any gas burner goes out for any reason, all will shut down simultaneously. Circulation of the cooking fats, due to below-surface application of the heat, produces a more even browning, avoiding carmelization of the chips. Cooking oils are continuously filtered.

Another step forward is our short vibrator belt. Here, the fried chips are continuously salted before they go to an overhead conveyor for distribution to the packaging machines: Salt drops from a vibrating overhead hopper onto the slowly moving 30-in. belt. In this manner, salt is uniformly distributed over every chip. In the former method, salt often piled up on some chips and entirely missed others.

Automatic Bagging

Salted chips move along a 150-ft. conveyor, at right-angles to the chip lines, to ten automatic Woodman bagging machines. An electronic control arm extending over the conveyor diverts portions of the chips to hoppers of the bagging machines. After a hopper is full, the arm is automatically tripped, and chips continue into the hoppers of the other bagging machines. If all hoppers are full, chips are conveyed to the end of the belt, to be fed into an overflow container.

Rate of feeding the hoppers determines the number of bags handled per minute. As a scale beam tips at the predetermined weight, a brass nozzle delivers a puff of air that momentarily closes the gate of the filling chute. At the same time, chips are blown off the scale hopper to go out through a spout on the front of the machine and into an acetate bag waiting to receive them. Bags are held open on a rotary holder beneath the lip of the spout. As each bag is literally "blown full" of chips, the next is turned into filling position.

Quick weighing and filling is the major advantage of this bagging system. Time is saved since there is no need to tip a scale hopper.

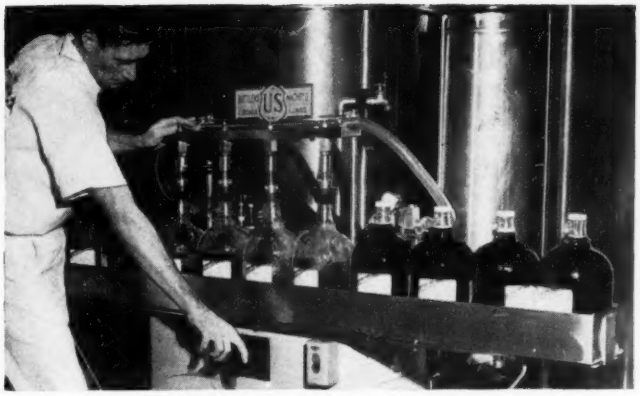
Mounted in a bracket on the scale is a mercury switch, and there is a magnet fastened to the scale beam. When this magnet makes contact with the switch, two electric air valves in the machine and an electric solenoid on the bag-holder conveyor are energized. One of the air valves blows chips into the bag, while the other forces the scale beam back to its normal position. The solenoid releases the bag holder, permitting it to receive the next bag.

On the bag holder are 15 scoop-shaped heads, each holding a bag open until it is filled. Bags are secured to the rotary holder by a clamp. As an empty bag is drawn under the filling spout, the preceding filled bag drops onto a vibrating, V-shaped belt. Here, the chips are automatically tamped in the bag as it moves to the sealer.

For greatest accuracy in weight, all bags are first filled to within 5 percent of the desired weight. Then, the bags move past a final dribble-feed station to receive the additional chips necessary. A simple sealer completes the operation—automatically folding, sealing, and stapling each bag.

Output on the packaging lines average 45 bags per minute for the popular 5c. size, to 15 bags per minute for the 39c. family size. A crew of three girls on each of the ten bagging and sealing machines turns out 1,800 doz. bags per day.

Netted by the improvements in frying and automatic packaging are 15 percent more saleable packages from the same amount of chips. Because of the elimination of waste, there is an increase, over previous output, of approximately 3 lb. of finished chips per 100 lb. of raw potatoes.



FOUR SPOUT unit is employed for filling 1-gal. glass containers with vinegar—another of the many products handled by Morton Foods.

Corn Chips, Spices, Mustard

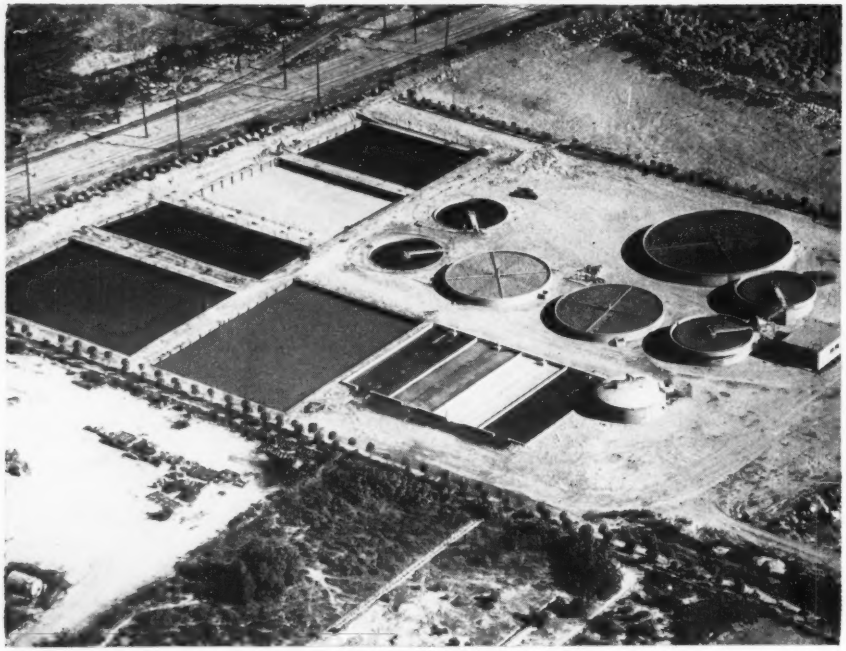
Similar packaging operations are carried out on the corn-chip line. Through rapid packaging, it is possible to hot-pack Texee's corn chips to insure better flavor.

Production of spices has benefitted materially through the installation of a new blending unit. By means of two augers, rotating at different speeds, blends are assured for the spice favorites.

Morton's has also achieved strides in the mustard-production line near the rear of the building. Located on the right side, at the head of the line, are storage-tank facilities for two carloads of mustard seed. The 575-gal. blending tank for the seed, oils, vinegars, and spices is constructed of stainless steel. So, too, are the aging and processing tanks.

After blending, raw mustard moves through two cracking mills into either of two storage tanks, each capable of handling 575-gal. batches. Following 24 hr. of aging, with continuous stirring, the product then moves through three mustard mills and into three storage tanks of equal capacity. Salad mustard is then automatically filled into 8-oz. and 1-gal. jars.

A SPECIAL FOOD ENGINEERING REPORT



TREATMENT plant at Lucky Lager brewery, Azusa, Calif., handles 670,000 gal. raw waste daily.

Sure Methods for Disposing

FOOD WASTES

How to remove their polluting, nuisance-causing organic matter so they can be discharged to streams. . . . ¶ Alternate means of riddance. . . . ¶ Problems are attacked by branches of industry

W. RUDOLFS and H. HEUKELEKIAN

Department of Sanitation, Rutgers University, New Brunswick, N. J.

Put bluntly, the days are gone when the food processor could let the matter of waste disposal "just solve itself." **Today, things are decidedly different.**

Public demand has now brought enactment of state and federal laws to curb stream pollution. And enforcement agencies have become much more alert—bringing pressure on the plants.

In this report, it has been our purpose to assemble a comprehensive collection of handy "how to" material to enable you—the processor—to meet these new insistent problems of waste disposal most satisfactorily and most economically.

Accent has particularly been given to pollution hurdles in specific branches of the industry.

To brief the factors, food plant wastes, when allowed to discharge into streams, add sludge-forming materials and products in suspension which upset the oxygen balance of the waters and give off obnoxious gases to the atmosphere.

During the warmer seasons, the gaseous products may lift the sludge to the surface of the water, creating unsightly and odorous conditions. Thus, near sewer outlets

where deposition of the coarser solids takes place, conditions become objectionable, although the overall effect on the oxygen economy of the stream may be beneficial because of the liberation of the gaseous products of fermentation.

The finely divided organic matter may be transported some distance, a certain amount being oxidized, and the balance flocculated and deposited to form a thin sludge carpet. The soluble material is oxidized and eventually stabilized.

Oxygen Supply Limited

If the quantity of all forms of organic materials is high enough in relation to the volume of water, the biochemical reactions, serving to stabilize the pollution, tend to deplete the oxygen in the stream. As a result anaerobic conditions are created which produce offensive odors. Long before the complete disappearance of oxygen, the fish will have migrated or died

Sources of oxygen in a stream are two-fold: That entering into solution from the atmosphere, and that produced as a result of photosynthetic activities of aquatic green plants, microscopic or otherwise.

Although an unlimited oxygen supply is available in the atmosphere, the maximum quantity that water can hold in solution is limited and depends on the temperature. Fresh water at 20 deg. C. (68 deg. F.) can hold only 9.2 ppm.

As the oxygen is utilized in the stabilization of organic matter in the waste, more can enter into solution. The greater the departure from the saturation value, the greater the rate of solution of oxygen from the atmosphere.

Under conditions of heavy pollution and high temperatures, demand exerted by biochemical oxidation may be higher than the atmospheric reaeration of the water is able to supply. Dissolved oxygen may then disappear completely until the organic material becomes sufficiently oxidized. Appreciable, but undependable, quantities of oxygen may be contributed by photosynthetic activities of green organism that supplement atmospheric reaeration.

Biochemical Oxygen Demand

The biochemical oxygen demand (B.O.D.) test is a measure of the amount of oxidizable organic matter and thus of the oxygen demand load placed on a stream. It is a standardized laboratory test simulating the biochemical oxidation of the stream. A standard oxygenated water is used for diluting the waste to provide an appreciable, but not a complete, utilization of dissolved oxygen at the end of a definite incubation period (usually 5 days).

Bottles containing the diluted samples are tightly stoppered to prevent the solution of additional oxygen from the air. Incubation is carried out at 20 deg. C. At the end of the incubation period, the dissolved oxygen remaining in the diluted sample is determined by the Winkler method and the results are expressed as ppm. of oxygen utilized by the undiluted sample.

Domestic sewage has a 5-day 20-deg. C. B.O.D. of 100-200 ppm. Many food wastes have values many times higher. The B.O.D. load discharged into a stream may be expressed as pounds per day, but a more convenient method is on the basis of population equivalents. Studies have shown that one person discharges 0.17 lb. per day ("5-day" B.O.D.). Thus the total pounds of B.O.D. produced or discharged divided by 0.17 will give the population equivalent of a given waste. To standardize the expression "pounds of B.O.D. produced by a waste," units of production are used, such as lb. of B.O.D. per case of No. 2 cans or lb. of B.O.D. per ton of beets processed.

B.O.D. is also used to determine the concentration and quantity of oxidizable organic matter in a waste as a measure of its strength, of the load placed on a stream, and of the loading and efficiency of treatment units.

Before treatment is undertaken, a great deal can be done by reducing wastes to a minimum through better housekeeping methods, recovery of byproducts, and seg-

These Pointed Questions . . .

- ***Brewers:*** **How best can you rid your plant of wash-water and press-liquor wastes?**
- ***Canners:*** **What new disposal method is proving unusually successful at a number of fruit and vegetable plants?**
- ***Citrus Processors:*** **Since chemical treatment of your wastes is ineffective, what is your best solution?**
- ***Confectioners:*** **What treatment reduces B.O.D. by 90 percent when applied to wastes from preparations of gums for making chewing gum?**
- ***Corn Products Maker:*** **What process change has achieved the dual benefit of reducing both solids losses and B.O.D. of your waste waters?**
- ***Dairymen:*** **How have changes in operating procedures greatly cut down B.O.D. of milk plant wastes?**
- ***Meat Packers:*** **What type of filters will cut most B.O.D. from your wastes?**
- ***Poultry Packers:*** **What simple treatment will remove 60 to 65 percent of suspended solids in your wastes?**
- ***Sugar Beet Refiners:*** **How does a simple clarification procedure aid your waste operations by enabling reuse of flume and process waters?**
- ***Wine Makers:*** **What is the most satisfactory way to dispose of stillage?**

. . . Are But a Few of Those Answered in This Plant-Practical Report

regation of process wastes from the relatively unpolluted wash, condenser, and cooling tower waters. Recycling of such waters in certain phases of processing, or discharging them directly into the stream, saves treatment capacities.

Methods of Treating Wastes

Normally, it is essential to provide for a storage and equalization tank in order to: (1) Furnish a uniform flow to treatment units, thus preventing great fluctuations caused by the various processing activities at the plant, which result in hydraulic overload at certain times and underload at others; and (2) blend the variable composition of the waste.

The storage and equalization tanks may require a capacity of 12-24 hr. retention of the waste production. If the waste contains suspended solids, sludge will be formed and provisions should be made for its removal. At times it is advisable to furnish some aeration in these tanks to prevent septic action.

Lagooning

A popular method for treatment of food wastes is by lagooning the raw or settled wastes, or treated effluents. Lagoons receiving raw wastes containing appreciable amounts of settleable solids accumulate sludge which eventually requires removal. They may be built for holding the liquid until high water stream flows. This virtually amounts to storing the total volume of waste until the next season, during which time considerable purification is brought about by natural processes, such as sedimentation, oxidation, and fermentation.

Usually, the oxygen demand of the wastes discharged into lagoons is so high that surface reaeration is not sufficient to maintain a positive dissolved oxygen level. Most of the biological action is, therefore, anaerobic, and thus produces offensive odors. Such odors can be controlled by the judicious application of sodium nitrate.

Primary Treatment

Most of the treatment processes used for food wastes have been adapted from sewage treatment facilities. These, in turn, are usually artificially intensified modifications of natural purification processes occurring in streams. Primary steps in the process are:

A. Screening and Grit Removal. Screens are very important in the treatment of certain food wastes, such as those from canneries. They remove coarse, unsightly organic solids, which would otherwise float on the surface of receiving waters or in sewage treatment sedimentation and digestion tanks.

Manually cleaned screens are not as satisfactory as mechanically cleaned ones. Removal of solids is a function of the size of openings. A 20-mesh screen is commonly used.

Grit removal of certain food wastes is advisable. This is accomplished in rectangular chambers or enlarged channels where velocity of flow is reduced to about 1 ft. per sec. Occasionally, grit is removed by ejectors.

B. Sedimentation. Removal of settleable coarse solids is accomplished in sedimentation tanks. The detention time here varies from 1-4 hr. at a velocity of 1 ft. per min. Successful performance of a sedimentation basin depends greatly upon inlet and outlet devices and baffling, and consequent distribution of the flow across the basin.

Manual cleaning of the deposited sludge is not commonly practiced. Hopper bottom tanks may be used, but mechanically cleaned ones are more frequently employed. There are a number of proprietary mechanisms available.

Properly operating sedimentation tanks give removals of 60 percent of suspended solids and 30 percent of B.O.D. on domestic sewage. These values may vary according to the character and concentration of materials in various wastes. With equal size of particles, greater removals are obtained from stronger than from weaker wastes. Greatest removals are obtained up to 2 hr. detention time; thereafter, they are not commensurate with increasing detention periods.

C. Chemical Treatment aids in removing nonsettleable finely divided solids. A coagulating agent is added, forming a relatively insoluble floc which enmeshes suspended and colloidal particles or adsorbs them upon its surface.

The coagulating agent may also ionize and liberate high valent ions that neutralize the electrical charges on colloidal particles and induce their aggregation and coalescence. Dissolved solids are not removed by chemical precipitation.

Chemicals commonly used as coagulants are ferric chloride, ferric sulfate, chlorinated copperas, and alum. These may be used alone or in conjunction with lime or acid. The latter have the ability to lower the dosage of coagulant, thereby reducing the total cost of the treatment.

Chemicals are added by dry or solution feed in quantities sufficient to produce a large settleable floc. (Selection of the proper ones and the optimum dosage can be made for each waste by laboratory jar tests with application according to the flow.) They are added to the waste in a flash mixer (1 min.), that discharges to a flocculator in which gentle agitation is practiced by means of paddles or compressed air for a period of 20-30 min. Mixing here should be sufficient to prevent settling, yet not fast enough to break up the floc.

The coagulated waste then passes into a sedimentation basin, where the sludge settles and the clear supernatant is discharged.

The volume of sludge from chemical treatment is considerably larger than from plain sedimentation because more solids are removed and the sludge produced is thin.

Secondary Treatments

Following removal of settleable materials, the waste is further treated to reduce its B.O.D. before discharge to a stream. This may be accomplished by:

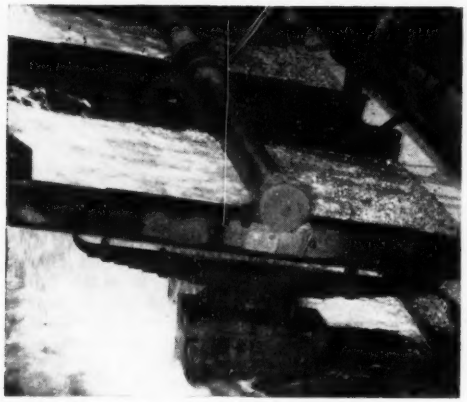
A. Sand Filters, in which the waste is applied at intervals to beds of sand. Stabilization is brought about mainly by biological action as the waste passes downward through the bed, and by mechanical straining action. Air is supplied by the dragging action of the waste, provided the surfaces are not sealed nor the under-drainage system clogged.

The bed consists of 30-40 in. of clean sand (with an effective size of 0.3-0.5 mm.) placed over gravel. Waste is applied to a depth of 1.4 in., and after a given dose passes through, the bed is allowed to rest for oxidation. This type of treatment gives very high quality effluent, but rate of application, especially of strong waste, is low.

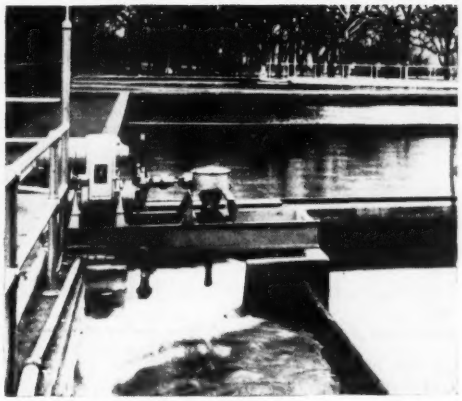
B. Trickling Filters. Here the waste is applied over a coarse bed of material, which may be crushed stone, limestone gravel, coke, slag, anthracite, or ceramic materials. Depth of the bed varies from 3-5 ft. in shallow beds and 6-10 ft. in deep beds. The most commonly used depth is 6 ft., and the size of stone 1½-3 in. in dia.

A well designed underdrainage system is essential to carry away the filtered liquid without clogging, and an

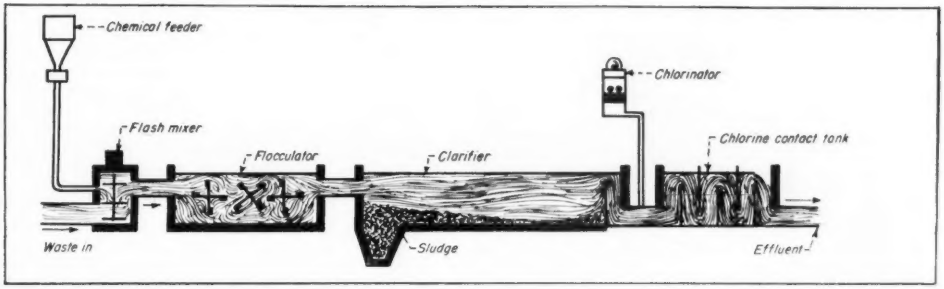
Primary Treatment Removes Suspended Solids



MECHANICALLY cleaned screens continuously remove unsightly organic solids which would interfere with later processing. (Seabrook Farms photo)



FLASH MIXERS such as this Dorrco unit intimately mix coagulating agents with wastes as the first step in chemical treatment.



FLOW SHEET of chemical treatment plant. Following mixing with chemicals, waste goes to flocculator and is gently agitated for 20-30 min., then enters clarifier where the sludge settles. When further treatment is omitted, effluent may be chlorinated and discharged directly into a stream.

adequate distribution system is required (fixed nozzles or revolving perforated pipes) to distribute the waste as uniformly as possible over the surface of the bed.

When sewage or other wastes are applied to a filter bed, a slimy growth soon develops consisting of bacteria, protozoa, and molds, intermixed with worms and larvae of insects. This rich biological population covering the stones serves to remove and oxidize the impurities in the waste.

There are two considerations in expressing the loading —hydraulic and organic. The hydraulic loading may be expressed in terms of gal. per acre, gal. per acre-ft. per day, or gal. per cu.-yd. per day. The hydraulic loading has importance in respect to size of distribution pipes and underdrainage systems, as well as the velocities in the bed.

Similarly, the organic loading is expressed as lb. B.O.D. per acre, per acre-ft., or per cu.-yd. The B.O.D. load may also be expressed on the basis of number of people served per unit volume of filtering material.

There are two types of trickling filters: The standard (low rate) and the high rate.

In standard filters the hydraulic rate of application of sewage is about 300,000 gal. per acre-ft., and the B.O.D. loading is about 200-400 lb. per acre-ft., or 0.1-0.2 lb. per cu.-yd.

High rate filters are treated with 2½-4 million gallons of sewage per acre-ft. per day and a B.O.D. loading of 1,800-3,000 lb. per acre-ft. The filters produce removals of 80-90 percent B.O.D.

Two main difficulties in the operation of standard filters are clogging and filter flies. As for the clogging, it is to be noted that the units unload automatically, usually twice a year. In between these sloughings, particularly in overloaded beds and with small size media, the film accumulates and fills the voids in the filtering material.

The other difficulty is breeding of a very small fly referred to as the filter fly or *Psychoda* species. It lays its eggs in the biological films which serve as feeding and grazing grounds for the larvae stage. The adults emerge in swarms during the warmer seasons.

High-rate filters are free from the above mentioned difficulties. Filtering material is of larger size (2-4 in.) and rate of hydraulic application is higher, inducing a continuous unloading which prevents clogging. Because of the continuous and uninterrupted application of waste, flies do not emerge from the bed.

High rate filters make use of recirculation of effluent to increase hydraulic flow and to increase the number of contacts between waste and biological growths.

Both conventional and high-rate filters are usually preceded and followed by sedimentation tanks. However, with wastes such as those from milk plants, con-

taining little settleable solids, primary sedimentation tanks may be omitted.

To catch the unloading solids from the bed, a secondary sedimentation tank is advisable. Sludge accumulated in this tank is referred to as humus sludge. This is highly putrescible and should be disposed of quickly.

C. Activated Sludge. This process makes use of biological communities similar to the trickling filter, except that the growth and food materials are both in motion, whereas in the trickling filter the growth is attached to the stones and is immobile.

Waste is mixed with active biological floc and kept in agitation for a period of time in the aeration tank. During this time, impurities from the waste are transferred to the floc and are partially oxidized. The floc is then separated from the supernatant liquor in a sedimentation tank, and a part of it is returned to the aeration tank.

Continuous Aeration Required

Means of agitation and keeping the floc in suspension in contact with the food may be mechanical, compressed air, or a combination of the two. When compressed air alone is used, it supplies oxygen at the same time. The air may be blown through porous plates and tubes, or perforated pipes.

In mechanically operated plants, the sludge is kept in suspension by some mechanical device and air is supplied solely from surface agitation. Spiral circulation is created in both compressed air and mechanical systems.

Air requirements depend on strength of waste to be treated, but normal-strength sewage requires about 1 cu. ft. of air per gallon treated. The aeration period is normally about 6 hr., but for strong wastes this may be increased to 12-24 hr.

Quantity of active floc to be maintained in the aeration tank varies with different wastes, but generally enough sludge is returned to maintain a suspended solids concentration of 1,000-3,000 ppm.

Large volumes of watery, putrescible sludge are produced which require rapid and adequate disposal methods. The excess sludge may be discharged into the primary sedimentation tank and may be disposed of along with the raw solids by digestion or by other suitable means.

Operating difficulties are: Bulking, foaming, and clogging of air diffusers. A bulky sludge is thin, settles slowly, and passes out with the effluent.

Efficiency of this process is normally higher than that of trickling filters. A B.O.D. removal of 90-95 percent may be expected.

Anaerobic Digestion

In sewage treatment, products such as sludges from primary sedimentation tanks, excess activated sludge, humus sludge from trickling filters, greasy scum, and screenings may be digested. In waste treatment, the same system may be applied to the various sludges and also to the liquid waste itself.

In the digestion of sludges, objective is to convert an offensive putrescible material to a stable humus-like residue with a reduction in volume and quantity. With liquid waste, the object is to reduce B.O.D. in similar manner as the oxidation devices such as trickling filters and activated sludge units. This method is feasible when the B.O.D. of wastes is sufficiently high, say 1,000 ppm. or more.

The process of digestion, whether of sludge or liquid, entails the conversion of complex organic materials (by a process of hydrolysis and liquefaction) to simpler intermediate compounds, which in turn can be utilized by methane bacteria and converted to methane and carbon dioxide.

A supply of digested sewage sludge expedites initial proper establishment of the process. Thereafter, careful husbanding of the sludge in the tank will insure maintenance of proper digestion.

When waste containing suspended solids or sludge is being digested, there will be an accumulation of solids which must be removed to make room for additional raw sludge. However, a minimum of the digested sludge must be retained.

In the digestion of liquid waste containing little, if any, suspended solids the accumulation of digested sludge is extremely slow, hence solids passing out with the effluent must be collected and returned to the digester.

Agitation Needed

Adequate contact between digested sludge and the food material is necessary. Normally, when solids are being digested, a circulation created by gas evolution cannot be relied upon for thorough contact between food and organisms. Mechanical agitation, or distribution of liquid waste from the bottom of the tank upward through the sludge zone is essential.

Under certain conditions, large quantities of organic

CANNING and domestic wastes are treated together in this Palo Alto, Calif., facility. Primary clarification is accomplished by vacuum flotation in Vacuator (arrow), then effluent goes to rotary distributor type biofilter (right), solids, both floating and settled, go to the digester at the left. (Dorr Co. photo)

acids are produced which lower the pH value and impair the gasification. Unless the liquefied material is gasified, intermediate products create offensive odors and a proper B.O.D. reduction is not effected.

Conditions which induce accumulation of acids and lowering of the pH value are: Excessive loading, carbohydrates, and poor buffer capacity of the waste.

If the difficulty is caused by excessive loading, then lowering the feeding rate or increasing the capacity of the tank is indicated. However, if lowering of the pH value is the result of the predominantly carbohydrate nature and low buffer capacity of the waste, it is essential to add a neutralizing agent.

Lime, sodium carbonate, or sodium hydroxide may be used for this purpose. The pH regulation should be carefully executed, so that the value does not rise much above 7.0-7.6.

Corrective measures should also be applied before the pH value has dropped to such a low value (6.0 or less) that most methane-producing organisms have already been destroyed.

Temperature has an important effect on the rate of digestion. The temperature of the tank should be maintained around 90-95 deg. F. for a maximum rate of digestion. This may be accomplished by circulating hot water through coils of pipe in the tank, by heating the waste with external heat exchangers, or by some other device.

Capacity of the digestion tank may be expressed either volumetrically, as number of days of detention, or on the basis of solids or B.O.D. loading. The maximum loading is 0.1 lb. of solids or B.O.D. per cu. ft. of tank capacity per day.

Volume of gas produced varies with the type of solids digested and is expressed as cu. ft. per lb. of solids added. The gas is normally high in methane (60-70 percent from sewage sludge) and is utilized for heating the tanks, for production of power, for compressing air, and pumping purposes.

The digestion tanks may be operated as single units or in series. They may be covered by floating or fixed covers.

Disposal and Utilization of Sludge

Sludges produced from primary and secondary treatment devices may be dewatered by vacuum filtration, after proper conditioning with coagulating agents. Chemicals most commonly used for the conditioning are ferric chloride and lime. Chlorinated copperas and ferric sulfate may take the place of ferric chloride, but larger quantities are needed.

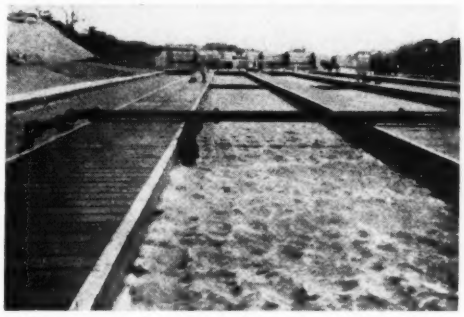
After proper conditioning the sludge is filtered, generally on drum-type vacuum filters, through a cloth stretched over the outer surface of the drum and supported over a copper mesh. The free water is drained and the sludge cake is scraped off. The cake contains 70-80 percent moisture, depending on the nature of the sludge. This may be dumped, buried, spread on land, dried by artificial heat, or incinerated.

The liquid-digested sludge may be dewatered on artificially prepared sand beds, aided by addition of alum or sulfuric acid. Sludge drying beds may be open or glass covered.

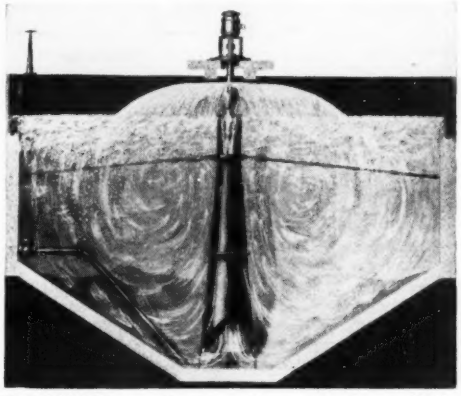
Liquid sludge may also be disposed of in lagoons. The addition of undigested sludge to such lagoons creates an odor nuisance.

Agricultural utilization of sludge produced from food wastes treatment is feasible. Sludges of this type have a high organic content which contributes to the humus of the soil, improves its texture and water holding capacity, and adds some nitrogen and phosphorus as well as small amounts of growth promoting substances and vitamins.

Aerating Activated Sludge



WHEN compressed air is used, oxygen is supplied to the sludge and keeps the mixture agitated. In this tank, the air is blown through porous pipes.



MECHANICAL aeration depends upon surface agitation for air incorporation.

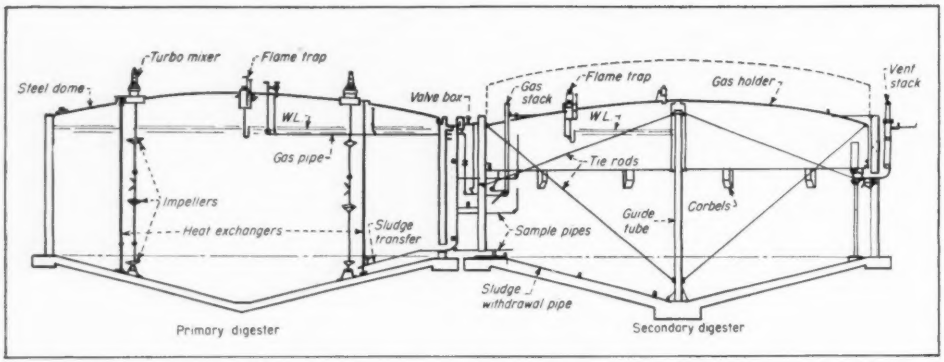
Milk Plant Wastes

Wastes from milk-products plants contain solids in a more or less dilute condition. Sources of these wastes are:

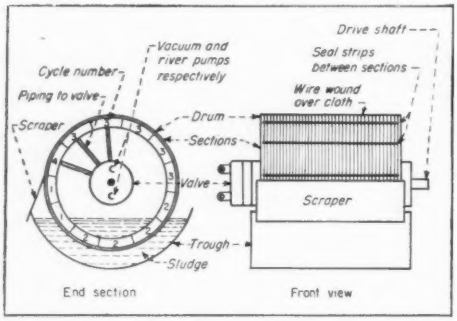
1. Spoiled raw or manufactured products
2. Byproducts (buttermilk, skim milk, and whey)
3. Spillage or overflow due to inefficient equipment and careless operation
4. Rinsings and washings from cans, equipment, and floors
5. Condenser water, and condensate from vacuum pans.

The milk solids contain fats, proteins, and carbohydrates, each of which has a somewhat different B.O.D. per lb. Since the amounts of each of these ingredients in milk and various milk products is different, their B.O.D. is also different. The B.O.D.'s of milk and the various

Sludges and Liquid Wastes are Digested



MULTIDIGESTER system (Dorr) converts waste to heating gases and humus-like sludge.



DRUM-TYPE filters are used to dewater the sludge.

byproducts are: Whole milk 100,000 ppm., skim milk 70,000 ppm., buttermilk 60,000 ppm., and whey 30,000 ppm. Further, 100 lb. of whole milk has a population equivalent of 60.

How to Reduce the Amount

Segregation of clean water from waste should be practiced. Prevention of losses by good housekeeping methods, careful operation, byproduct utilization, and provision for adequate and efficient facilities is important. Spoiled batches or byproducts should not be dumped into the drain.

If the quantity of byproduct is not sufficient to warrant recovery, other provisions should be made, such as returning them to the farms for feeding purposes. There are various practical means of reducing spillage and overflow—rinsings and washings from tanks, cans, and floors should be reduced to a minimum to reduce volume, strength, and cost of treatment.

These wastes are almost entirely in solution or colloidal suspension, and storage results in fermentation of the milk sugar, producing lactic acid, and precepitation of casein and other protein materials. Under anaerobic conditions, these wastes become septic and odorous. Under aerobic conditions, milk solids are readily oxidized.

Preliminary treatment does not result in reduction of B.O.D. Screens should be provided to remove large particles, such as bottle caps.

Practical methods of treatment and disposal are:

Land Irrigation, which may be used by plants located in sparsely populated areas. This method is applicable only during the summer months in the northern parts of the country but has a wider use in warm and arid regions. The land must be kept under constant cultivation, and it may be furrowed, with crops grown between the furrows. The soil must be light and sandy and may be underdrained with tile. Provision should be made to apply the waste to alternate portions of the field.

Aeration and Preaeration. At a milk plant, operations are not uniform. Consequently, very strong wastes are produced when they are at their height and almost clean water at night. Because of this wide variation, and since it is desirable to operate treatment facilities at a uniform rate, storage and equilization is necessary.

To prevent anaerobic action during storage, it is good practice to aerate the waste. Air application results in considerable B.O.D. reduction and may be sufficient. The process gradually produces a sludge which approaches activated sludge.

Detention time in the aeration tank varies from 12-24 hr., depending on whether the tank is used for storage and equilization ahead of oxidation devices or whether it is used as a means for complete treatment. Provision should be made for removal of sludge, and compressed air should be provided at the rate of about ½ cu. ft. per min. per lb. B.O.D. per day.

Biological Filtration. The standard or one-pass filters have been replaced by recirculating units because of their efficiencies and greater load capacities. The recirculating filter may be single-stage or two-stage, depending on the degree of removal required. It is preceded by an aeration tank which also receives the recirculated effluent, and is followed by a settling tank for removal of suspended material from the effluent.

Some provision is made for disposal of the sludge from these tanks. It may be digested in heated tanks and dried on sand beds, or the undigested sludge may be ponded or hauled and applied to land.

The fill and draw recirculating filter is adapted for use at small plants. The equalization tank has capacity for one day's production of waste, which is pumped to the filter at a rate providing 8-10 recirculations. The tank is emptied each morning before a new batch of waste is applied. Loading on the filter is at the rate of 1 lb. B.O.D. per cu. yd. of stone.

Up to 95 percent B.O.D., reduction is possible by this batch filtration process, depending upon the number of

times the waste is recirculated and its initial concentration.

The single-stage recirculating filter is adapted to plants where an effluent having a B.O.D. of 70-100 ppm. is satisfactory. It is provided with screen, grit chamber, aerated storage tank, a filter 6 ft. deep equipped with a suitable distributor, and a settling tank.

Part of the settled effluent is recirculated to the aerated storage tank, while sludge is collected from the aerated storage and final settling tanks. Recommended loading is 1 lb. of B.O.D. per cu. yd. and expected B.O.D. reductions 75-80 percent.

A two-stage recirculating filter produces a higher reduction of B.O.D. when the two filters are operated in series. With two-stage filtration, the units may be shallower (4 ft.). Loadings on the first stage are usually higher (1.5-2.0 lb. per cu. yd.) than on the second stage (0.75 lb. per cu. yd.). Two-stage filters are operated with recirculation within each stage, and produce 90-95 percent B.O.D. reductions. (See illustrations p. 112.)

Activated Sludge. This process can be successfully used for complete treatment of milk wastes. An adequately designed, well operated plant of this type is not readily upset, nor is the control procedure too difficult for the personnel available at the milk plant.

This process has lower construction cost, requires less area, and produces a better effluent than the biological filtration. The basic capacity of the aeration tank is about 80 gal. per lb. of B.O.D. Air requirements are approximately 1 cfm. per lb. of B.O.D. per day. Mixed liquor has a suspended solids concentration of 5,000-6,000 ppm.

Canning, Freezing, and Dehydration

Large volumes of water are used for canning, freezing, and dehydration in washing and blanching the produce, washing equipment and floors, and for hydraulic movement of products within the factories. Wastes consist largely of carbohydrates in suspension and solution. Water used in cooling of heat-processed containers usually contains little or no organic matter and hence should be separated from other factory wastes and disposed of without treatment.

The volume and characteristics of waste waters vary greatly among the different products packed, among packers of the same product, and from day to day in the same plant. Therefore, it is necessary to study each individual case separately.

Methods of Treating

The type of treatment most suitable for a particular plant will depend upon the volume and characteristics of each type of waste produced, degree of treatment required, and area and topography of land available for treatment plant. Since the operations are mostly seasonal, expensive treatment plants cannot be justified economically.

Methods most commonly used: Screening, chemical precipitation, lagooning, and discharge to municipal plants. Biological treatment by trickling filters and activated sludge is seldom employed.

Screening is an absolute minimum of treatment, unless the wastes are discharged into lagoons where odors are no problems. Failure to screen (1) causes complaints when wastes are discharged into streams, because of unsightly conditions and odors; (2) overloads lagoons and digesters; (3) creates scum in sedimentation tanks, and (4) clogs filters and distributors of municipal sewage plants. Mechanically operated 20-mesh screens are recommended.

Chemical Precipitation lends itself to the treatment of cannery wastes because: (1) Immediate start of treatment is possible without a period of maturing such as is required for biological methods; (2) capital investment is lower than for biological methods, and (3) the considerable amounts of finely divided suspended solids present are easily removed by this method.

On the other hand, degree of treatment is limited because chemical precipitation does not remove the soluble organic materials present in the waste. Hence this method of treatment does not produce a high quality of effluent. Another disadvantage is the large volumes of sludge produced.

Chemical precipitation requires: (1) Raising the pH of the waste to 10-11; (2) formation of a large rapidly settling floc, and (3) complete and prompt removal of settled floc. Lime is used to raise the pH. It is capable of effecting good B.O.D. reduction with many wastes, but floc produced by lime alone may be small and slow settling.

Addition of iron salts and alum produces large, rapidly settling flocs, and a combination of lime and iron salts is most effective. Ferrous sulfate is most generally used because of ease of storing and handling.

Varying Dosages

The batch method of treatment is preferable to continuous operation, because the rapid changes in the characteristics of the waste makes it difficult to adjust the optimum chemical dosage to continuous flow. Chemicals are mixed and stirred with the waste, the floc is allowed to settle, the clear supernatant discharged, and the sludge drained and dried on sand beds. The dosage varies from 5-15 lb. of lime and 1-8 lb. of ferrous sulfate per 1,000 gal. of waste.

Approximately 50 percent of the B.O.D. is removed by this method. The sludge represents 10-15 percent of the waste volume treated. At a pH of 10 or higher this will dry within 7 days without producing odors.

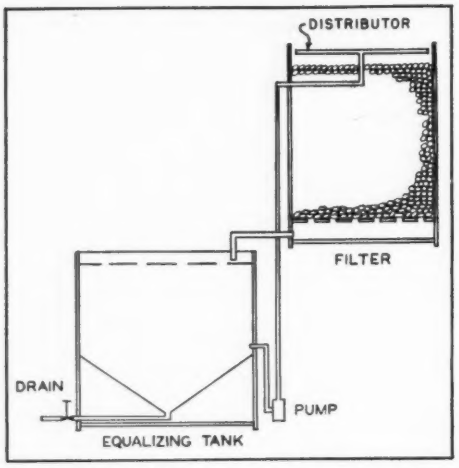
A considerable amount of experimental work indicates that biological treatment of these wastes is feasible.

Land irrigation is the most economical method of pollution abatement caused by these processes. However, a porous soil with high water-absorption capacity and a low water table is a prerequisite. Contamination of ground water is a possibility that should be given due consideration. Soil absorption may be practiced through gravel pits, uniform distribution over sandy areas or fields, or discharge into furrows.

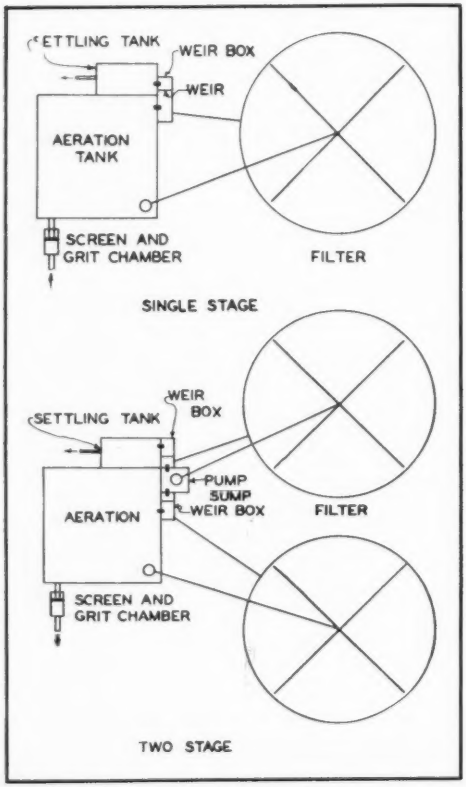
A recent development along these lines is the spraying of frozen food wastes in forest areas. The previously screened wastes are sprayed into the air and seep through forest litter and underlying sandy soil. Extraordinary high rates of application have been made without clogging. Test wells show no contamination after more than a year of application.

However, the method is not applicable to heavy clay forest soil, and to a much less extent on grass or cover-crop areas. Bare sandy areas soon clog and puddle.

Lagoons constitute a commonly used method of treatment for this type of food processing wastes. Untreated lagoons produce offensive odors and should not be used unless located in isolated areas. Screening must be provided to eliminate deposition and eventual removal of sludge. Provision must be made for the final disposal of relatively strong liquid remaining in untreated lagoons by soil absorption or discharge into streams at times of high flow.



FILL-AND-DRAW filter achieves up to 95 percent B.O.D. reduction. Equalization tank holds day's production of waste, which is recirculated 8-10 times.



SINGLE STAGE filter (top) is adapted to plants where an effluent with 70-100 ppm. B.O.D. is satisfactory. For greater reductions, two filters are used in series (above). They are operated with recirculation within each stage.

Deep lagoons, providing for anaerobic digestion, have operated satisfactorily with non-settled tomato wastes, provided that the liquid portion can be disposed of prior to the following packing season. Bottoms of these lagoons become sealed with a thick layer of digested solids.

Addition of sodium nitrate to lagoons has become generally accepted. Its benefits are: Furnishing available oxygen from the nitrate radicle; stimulating development of green microorganisms which produce additional oxygen, and maintaining an alkaline reaction through the formation of sodium carbonate. It is not necessary to add sufficient sodium nitrate to completely satisfy the oxygen demand of the waste. Quantity of sodium nitrate added may be varied from 20-200 lb. per 1,000 No. 2 cases, according to product packed.

Lagoons should be of a sufficient capacity to receive the entire volume of liquid waste produced in a season plus an extra 25 percent which should be retained at all times.

Retention of this volume of waste in a lagoon is beneficial because it dilutes the strong waste (admitted at the start of a new pack) with water saturated with air and containing green microorganisms and other seeding organisms.

Large shallow lagoons (3-5 ft.) are recommended to provide better surface reaeration. Water-tight embankments should be high enough to prevent spillage. Excellent B.O.D. reductions have been obtained, and no difficulty has been experienced in the discharge of these wastes into small streams following winter storage.

Municipal Plants

Treatment of the wastes at municipal sewage plants is feasible when there is ample capacity, since the organic matter contained is not inimical to biological treatment. Failure to obtain a normal degree of treatment is generally due to either volumetric or organic overloading. Septic conditions may be created occasionally in flat sewers, and difficulties may be experienced with floating solids and scum in primary sedimentation and digestion tanks.

Efficient screening at the processing plant is essential prior to discharge to municipal sewers. To reduce the load on secondary treatment facilities, chemical treatment may be practiced during the canning season, either at the municipal plant or prior to discharge into the sewer at the canning plant.

Waste Utilization

The concentration of organic material is not high enough for recovery or utilization. It is not practical to reuse water in a closed system, because of the edible nature of the products involved. To a limited extent and with certain products, water may be used for counter-flow washing. Can cooling water is sometimes used for cooling or in preliminary washing operation.

Utilization of solid wastes from fruit and canning plants is more feasible, but has not been practiced because of the seasonal nature of operation, perishability of the wastes, insufficient quantities, prospect of comparatively small financial return, and additional responsibilities during the busy packing season.

The only vegetable wastes utilized in quantity are pea vines, and corn cobs and husks, which are stored for winter animal feeding. These are usually cured in stacked silos, or by artificial drying. Return to land for soil enrichment should prove valuable.

Fruit wastes offer a wide variety of byproducts, such as vinegar, pectin, syrup from apple wastes, edible sweet oil and almond oil from apricot and peach pits, and feed yeast from pear wastes.

Citrus Fruit Wastes

Processing converts 60 percent of the citrus fruit to waste as peels, rag, and seed. Liquid wastes are produced in canning the juice and sections, and in preparing feed, citric acid, and pectins. It is estimated that in 1949 solid citrus wastes amounted to 3.5 million tons and liquid wastes to 4 billion gallons, varying in B.O.D. from 100-100,000 ppm.

A great deal of the solid wastes is used for production of peel oils, seed oil, cattle feed, and brined or candied peels. After extraction of peel oil and pectin, the solid residue may be dried for feed. Liquid wastes with high B.O.D. are produced in this process. Solid wastes may be allowed to decompose on waste land, in heaps, or in silos. Or it may be ground and used as a fertilizer base.

Canning Plant Effluents

Wastes produced from the canning processes consist of fruit washing water, waste water from peeling and sectionizing tables, flushing water from floors, and water dripping from waste bins. These wastes produce a volume of 50-57 gal. per case of No. 2 cans. Composition varies with the nature of the pack.

A plant packing both sections and juice produces a waste with B.O.D. values varying from 100-1,400 ppm. A reduction of 50-90 percent of the B.O.D. can be obtained by screening and coagulation with alum and lime, followed by dilution with can-cooling water which has no B.O.D. Additional purification can be obtained by trickling filters. This method is still in the experimental stage, because of high cost.

Chemical treatment is not efficient because most of the B.O.D. material is in a soluble form. Other methods tried experimentally without success employed contact and sand filters and activated sludge. Fermentation with yeast and other organisms, and methane fermentation have also been tried.

Ponding requires isolated and sandy areas. Such ponds clog, create odors, and breed flies. After the liquid has evaporated, the sludge is dried, collected, and burned. Sodium nitrate in conjunction with lagooning of these wastes has been tried.

Raw or improperly treated effluents, discharged into surface waters, create sludge deposits which are brought to the surface during the warmer months by gas flotation, and cause a decrease in the dissolved oxygen of the water.

Pulp Drying

In drying pulp, the ground product is limed, which results in the production of juice "bleed liquor" augmented by the press liquor. The latter amounts to 960-1,400 gal. per ton of dry pulp. The press and bleed liquors have a B.O.D. of 40,000-100,000 ppm. Putrefying readily, they contain about 6.6 percent total sugar, which can be utilized for alcoholic fermentation or yeast production.

Although the B.O.D. of the liquor is reduced by yeast and alcohol production, there is a considerable amount of residual B.O.D. left in the effluent which requires further treatment before disposal. Lactic acids can also be obtained by fermenting the press liquor, and citric and ascorbic acids by ion exchange resins.

Most satisfactory method for disposal of these liquors has been evaporation to yield molasses, used as feed. Addition of urea to the molasses increases the nitrogen content. In the 1947-48 season, about two-thirds of the press liquor was disposed of by converting it to molasses, but its production is affected by the market price of cane and beet molasses.

Discharge of citrus effluents into citrus groves has been tried. It is reported to result in defoliation of trees. Pulp drying liquors discharged into wells resulted in contamination of underground water supplies and production of gas. Discharge into municipal sewers is not satisfactory, because of the high acidity, low nitrogen content, and inadequate capacity of plants.

Meat Packing Wastes

Every meat operation, from stockyard through slaughterhouses and packinghouses, produces wastes which are highly putrescible. The volumes vary from 1,900-8,700 gal. per ton of kill, averaging 4,130 gal.

Waste from slaughterhouses killing cattle and hogs contain suspended solids of about 900 ppm. and a B.O.D. of 2,200 ppm. The weighted average of wastes from various operations in a number of packinghouses show suspended solids of 645 ppm. and B.O.D. of 9100 ppm.

Blood should be recovered as completely as possible, since it has a very high B.O.D. Use of paunch manure as fertilizer and production of tankage from the rendering process is common. Recovery of grease by means of screens, vacuators, skimming tanks, and grease traps is a very helpful measure in reducing waste quantity.

The type of treatment adapted depends mostly on the size of the plant operation, with other considerations being such factors as the dilution available in receiving streams and required standards.

Small industries may employ screens, sedimentation basins, sand filters, and chlorination, whereas larger ones may also use chemical precipitation, biological filtration, or activated sludge.

Sedimentation removes approximately 60-65 percent of the suspended solids and 30-35 percent of the B.O.D.

Optimum for the chemical coagulation of packinghouse wastes is a pH below 6.0. Alum produces a poor floc, ferric chloride and ferric sulfate produce better results, but are not dependable. Chlorination, to precipitate the proteins, has been tried, but abandoned because of the high cost, toxicity of the sludge when used as feed, and the necessity of excluding much of the waste from the process.

Low-rate and high-rate filters, as well as double filters, are preceded by screening and settling, and followed by final sedimentation. Low-rate filters remove 80 percent of the B.O.D. Double filtration with a washable primary filter, followed by sedimentation and secondary filtration, has been practiced, giving an overall B.O.D. reduction of about 94 percent.

An activated sludge plant, installed with provision for preaeration and sedimentation, followed by aeration for a period of 17½ hr. with 4½ cu. ft. air per gallon, produced an overall reduction of 98.8 percent B.O.D.

There are a number of municipal plants which treat packinghouse wastes with domestic sewage. In most cases some sort of pretreatment is advisable before mixing with sewage.

Chicken Packing Wastes

A chicken dressing and packing plant is a mechanized slaughterhouse in which the chickens are killed, bled, cleaned, singed, washed, and chilled. Wastes are derived from feeder or receiving stations (manure and spilled food

washed from the floor), washings, from the batteries of coops, killing rooms (blood, dirt, some feathers, and wax) and packing rooms (mainly floor washings).

The volume of waste per ton of live chicken processed varies from 1,000-3,000 gal. Strength varies greatly, depending upon whether or not batteries are scraped, how much blood is saved, and general housekeeping practices.

Suspended solids vary from 500 to 15,000 ppm., and B.O.D. from 300 to 7,500 ppm. Population equivalent on a B.O.D. basis varies from 30 to 600 per ton of live chickens processed.

Removal of manure from batteries by scraping and saving of blood reduces the strengths of the waste from ¼ to ½. Treatment by plain sedimentation will remove 60-65 percent of suspended solids if the manure from batteries is removed prior to settling. The sludge can be digested, and the effluent can be further treated by trickling and sand filters.

Fermentation Processes

There are three main fields in the fermentation classification: Brewing; commercial yeast manufacturing, and wineries.

The major byproducts from brewing operations are spent grains, hops, and yeast, which are largely recovered and utilized. Wastes consist of wash waters, press liquors, and waste beer.

Spent grains are separated from the wort, dewatered to 65-70 percent moisture, and dried. About 25 percent of the original grain entering the brewery is recovered and used as feed.

There is no similar outlet for the recovered hops. They have been used to a limited extent as a fertilizer, but more commonly are burned under boilers.

Yeast produced during the fermentation amounts to 0.6-0.8 lb. (dry) per barrel of beer. Surplus yeast not used for fermentation amounts to about 40 million pounds a year. Only about 12-14 million pounds of this are recovered, the remainder being disposed of, with other residues, as wet feed. Food or pharmaceutical yeast is recovered to a certain extent.

The volume of waste ranges from 180-500 gal. per 31-gal. barrel. The B.O.D. varies from 420-1,200 ppm., suspended solids from 245-650 ppm.

Brewing wastes are usually handled satisfactorily with sewage. A combination of settling, digestion, and trickling filters has been used for treatment.

Yeast Manufacture

Most commercial yeast is produced by aerobic fermentation of molasses or steep water fortified with inorganic nutrients. Then the yeast is separated and washed in centrifuges. The spent broth without the wash waters has a B.O.D. of 3,000-14,000 ppm. From 1-1½ gal. of waste is produced per pound of yeast.

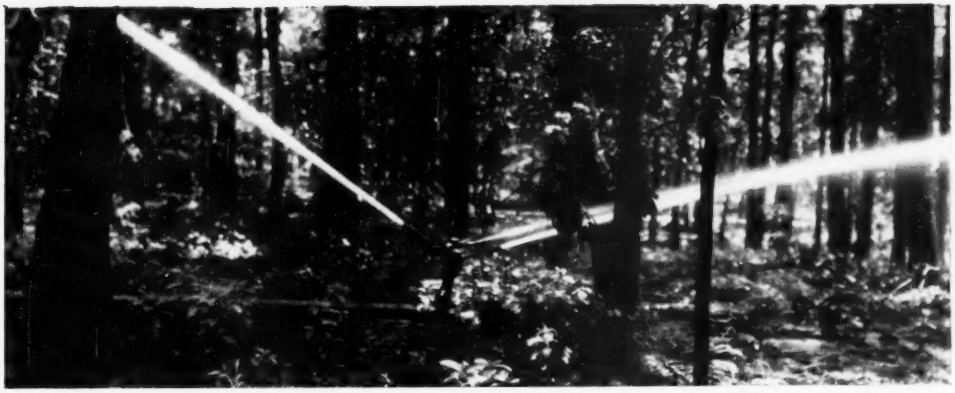
Recovery of the spent broth for feed is not considered economically justified. The waste is amenable to digestion. At 95 deg., 2½-3½ days detention time is required. Further treatment of the effluent can be accomplished on high-rate trickling filters with recirculation.

Wines

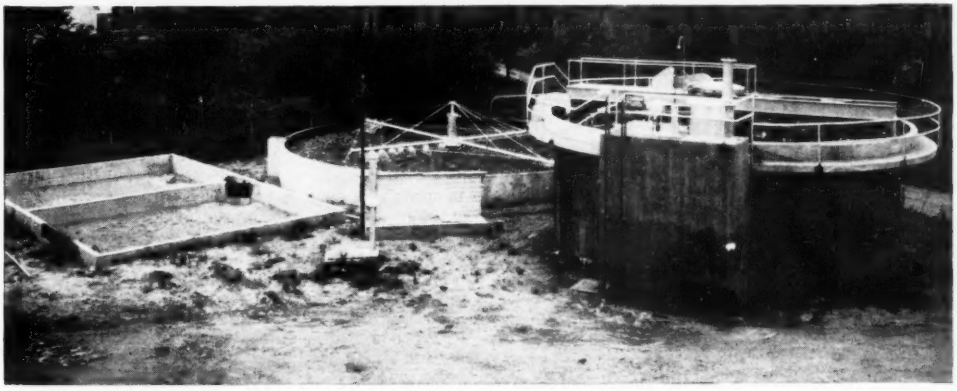
Winery and brandy residues, from which various byproducts are derived, consist of pomace, lees, "wine stone," and stillage. The latter is the waste material produced by distillation of wine or pomace for fortifying spirits. Lees are the sludges remaining in fermenting and aging tanks after the wine is decanted or refrigerated. They contain potassium bitartrate, which crystallizes on fermenter walls or floor and is referred to as wine stone.

Tartrates may be recovered from pomace and stillage as well as from lees and wine stone. Pomace, which consists largely of grape skins, seeds, and pulp, is separated from the must (crushed grapes) prior to fermentation in the processing of white grapes, and after fermentation in the production of red wines. After pressing, it contains

GUM WASTES treatment plant receives raw wastes with B.O.D. of 3,000 ppm. and discharges effluent with 33 ppm. Flowsheet involves equalization, pre-digestion, biofiltration and slow sand filters. (Dorr Co. photo)



SPRAY IRRIGATION is seen as practical method for disposing of frozen food wastes. Following screening, wastes are sprayed into air and seep through forest litter and underlying sandy soil. (Seabrook Farms photo)



PACKINGHOUSE WASTES treatment plant. Primary and secondary sedimentation and digestion are accomplished in 28 ft. Duo-Clarigester (foreground). Seen rear is biofiltration in 45-ft. Dio-Filter. (Dorr Co. photo)

60 percent moisture and represents 10-20 percent of the weight of original grapes.

Pomace is a source of both tartrates and alcohol which can be recovered. The final residue after the separation from the stillage may be used as feed or fertilizer. Grapeseed oil and tannin may also be recovered from pomace.

Stillage and de-alcoholized effluent from stills are not readily disposable. It is generally run into settling basins. When the basins are overloaded, foul odors result, and various types of insects add to the nuisance. Intermittent irrigation appears possible. Settling tanks with lime flocculation reduce pollution appreciably. Oxidation on trickling filters is feasible, but costly.

Corn Starch Waste

Manufacture of starch, oil, syrup, sugar, and cattle feed from corn by wet milling processes uses 130 million bushels per year with some of the larger plants processing 50-100 thousand bushel per day. The feed obtained is derived from every constituent of corn except starch and oil.

Formerly, only the starch was recovered, which resulted in 25 percent loss of the dry substance as waste. Recovery of feed stuffs reduced these losses to 7-8 percent, and with evaporation and recovery of steep water solubles the losses were further reduced to 2-4 percent.

However, the pollutional effects of this small fraction of loss represents a problem of considerable magnitude. Re-use of certain waste waters in "bottled up" systems reduces the losses to less than ½ percent of the dry substance of the corn.

The bottled-up process may be summarized as follows: Recirculation of process water within the process, evaporation of a portion of the recirculated water as steep water, adding all organic residues to the gluten, and drying to make an improved cattle feed. This process has reduced the losses per bushel of corn in terms of population equivalents from 10 to 1.

Wastes that enter the factory sewers from the process are polluted mostly with organic solubles from the corn kernel and corn syrup and, therefore, are amenable to treatment by standard processes, particularly when they are mixed with domestic sewage. They have been treated in a municipal plant, with operations consisting of primary sedimentation and activated sludge processing for one-third of the primary effluent and trickle filtering for the remaining two-thirds. The sludge is then digested.

The plant treats almost equal volumes of domestic sewage and corn products wastes. The hot starch wastes raise the temperature of the sewage and improve the sedimen-

tion, digestion, and trickling-filter operation. But they increase the odors produced in the sewers and the septicity of the sewage, which results in lower loading in the activated sludge process, and in sludge bulking.

Beet Sugar Wastes

The pollution problem created by beet sugar wastes is aggravated by the fact that the operation is seasonal and restricted primarily to three states (California, Colorado, and Idaho). Wastes arise from hydraulic transportation of beets (flume water), screen water (from screening the pulp), press water (from pressing the pulp), Steffen's waste (from treatment of diluted molasses with lime to recover sugar as calcium saccharate), lime cake slurry, and silo drainage.

Of these various wastes the flume water has a high volume (70 percent of the total) but a relatively low B.O.D. (4.5 lb. per ton of beet sliced). Screen water is moderate in volume and B.O.D., contributing 2-6 lb. per ton of beets sliced. Press water contributes 2.6 lb. of B.O.D. per ton sliced and Steffen's waste 230 lb. per ton of molasses processed. Lime cake slurry and silo drainage contribute, respectively, 6.5 and 12.3 lb. B.O.D. per ton of beets sliced.

The flume water contains considerable quantities of suspended matter which can be readily settled out and the water reused. Waste from the pulp screens can be eliminated by a continuous diffuser and mechanical conveyor to transport the drained pulp to the presses.

Lime cake drainage can be eliminated by transporting the cake from the factory in a fairly dry condition. Pulp silo drainage can be eliminated by pressing and drying the pulp. Condenser water can be used for fluming and washing of beets and also in the diffusion battery.

Ponding of flume water is commonly practiced. But the deposited sludge creates offensive conditions and the effluent may be worse than the raw waste. Ponding of lime slurry is successful when the supernatant can be bled into the stream at high flows, and the accumulated lime sludge can be removed and used for soil conditioning. Ponding of Steffen's waste is not satisfactory because the high B.O.D. requires long storage periods and careful control of the discharge during high stream flows.

Screening, removal of grit, and settling of flume and process waters results in removal of 90 percent suspended solids and 40 percent B.O.D. Substantially similar percentage removals from straight house process water and Steffen's waste can be obtained by these methods of clarification.

Coagulation of flume water improves the removals as compared with plain sedimentation, but the additional cost may not be justified by the results. Biological filtration of flume, pulp, and diluted Steffen's waste is feasible, but because of the short campaign period, is not generally practiced.

Cane Sugar Waste

The waste from processing cane sugar originates from the purification and crystallization processes, molasses and its byproducts, and condenser water. The pollutional characteristics of the combined mill wastes vary from 250-1,200 ppm. B.O.D. and 150-2,300 ppm. suspended solids. Water used in the various processes averages about 500 gal. per ton of sugar processed.

Disposal of waste is frequently by discharge into streams or rivers.

Candied Fruit Wastes

In the manufacture of candied fruit, large quantities of sugar may be discharged mixed with preserving agents, such as sulfur dioxide or brine. The raw wastes contain 16,000-18,000 ppm. total solids (¾ in a soluble state) low in suspended solids, 9,000-9,500 ppm. reducing sugar, and about 7,500 ppm. B.O.D.

Laboratory and pilot plant experiments dealing with digestion and aeration of the waste showed that a high degree of purification could be obtained, but that after a period of operation, the effluent deteriorated because of the accumulation of toxic preservative.

Treatment of the waste, after admixture with domestic sewage, by trickling filters is very satisfactory. Double filtration permits loadings 2.5-3 times as high as a single filtration (without sacrificing the quality of the effluent).

Gum Waste

Before natural gums are used in the manufacture of chewing gum, they are washed with hot detergent solution to remove sand, dirt, debris, and other undesirable materials. They are further processed before shipment to the chewing gum manufacturer.

The wastes, discharged at a temperature of 140 deg. F., have a deep red color, and they contain pieces of gum and considerable amounts of soluble organic material, in addition to sand, dirt, and debris. Coarse material settles readily. The waste has a total solids content of about 14,000 ppm., suspended solids of 970 ppm., a B.O.D. of 3,800 ppm., and pH of 10.5.

On the basis of laboratory and pilot plant experiments, a full scale plant was constructed consisting essentially of two continuous upward flow digesters, followed by settling equipment, trickling filter with recirculation, sand filters, and final settling tank. Average operation results for a period of 8 months show a flow of 25,000 gal. per day and overall B.O.D. reduction of 90 percent.

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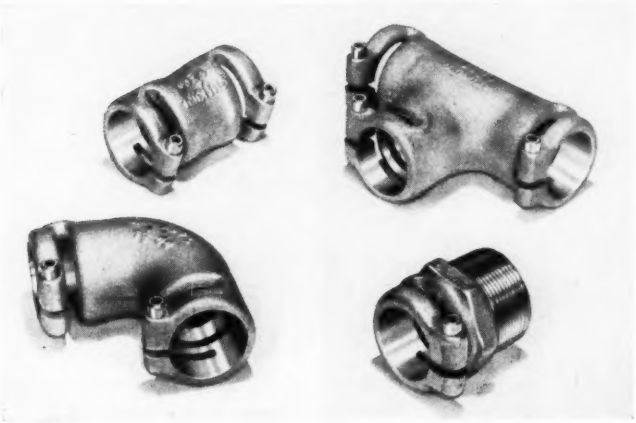
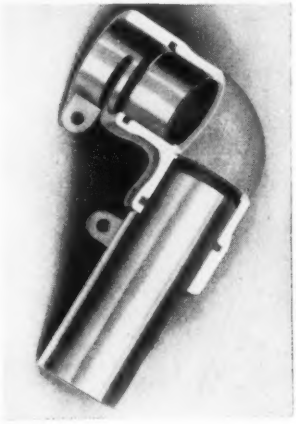
NEW EQUIPMENT & SUPPLIES





Stainless Steel Fittings Save Labor, Material

Assembly costs are reduced and less-expensive lighter-wall stainless steel tubing can be employed with the "Quikupl" stainless steel fitting, a newly designed coupling.

Chief advantage claimed for the new fitting is the saving made by eliminating such operations as threading, flaring, sweat-soldering, brazing, or welding. With the new coupling, pipe or tube is simply cut to length, deburred, and inserted in the fitting, which is completed merely by tightening a small screw.

With the omission of threading, states maker, there is no extra cost of heavy walls formerly required to take threads for screwed fittings. Furthermore, where concerns already have changed to lighter-wall tubing, new fittings are seen materially reducing cost of flaring, fabrication, or welding.

In design, fittings resemble standard elbows, tees, ells, and other universal shapes, with the addition of an integral clamp. Pipe or tube is merely inserted and only one tool—a simple hex wrench—is needed to tighten the clamp.

Inside the fitting is a resilient synthetic sealing ring contained in a groove machined into the bore. This seal is constructed to maintain a squeeze fit regardless of commercial tube and pipe tolerances. Its design is such that pressure in the line, from either direction of flow, jams it into a positive fit and seals any space between fitting and tube or pipe.

Fittings in tees, couplings, ells (45 and 90 deg), and adapters in Types 304 and 316 stainless are available. Other types are expected to be added. For use at temperatures up to 275 deg. F., depending on corrosive agent involved, fittings are in the 150 psi. class. Adapters will facilitate the coupling of tube lines to existing pipes and fittings.—*Peter A. Frasse & Co., Inc., 17 Grand St., New York 13, N. Y.*

Circle 117A on Reader Service Card

Power Belt Conveyor Is Light, Portable

This 10 ft., lightweight power belt conveyor has been designed for ready portability and easy adjustment. It is electrically reversible.

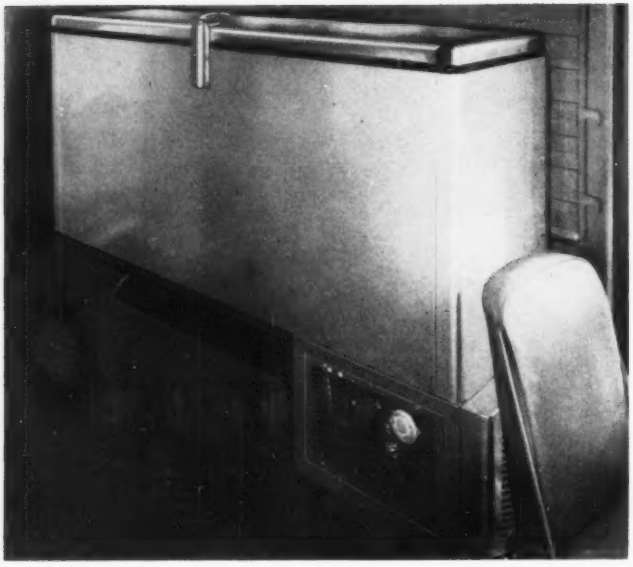
Known as Speedlift Jr., unit is recommended for use in warehouse stacking, also as a booster in gravity conveyor lines, and for moving materials up average stairways. Machine has two 8-in. dia. semi-pneumatic tires for easy movement, and there are grip handles on each side for safe and quick shifting from one place to another.

Conveyor is also equipped with two specially designed snub idlers for positive belt tracking, which means that no adjustment is necessary. If requested, unit can be equipped with an adjustable "Heavy Duty" support at the high end.

This conveyor can be used at any angle up to 30 deg. to move all types of material on its rough-top 12-in. wide, 3-ply duck belt. Prompt delivery is assured by manufacturer.—*Speedways Conveyors, Inc., 1263 Niagara St., Buffalo, N. Y.*

Circle 117B on Reader Service Card

Mechanical Refrigerator for Delivery Trucks



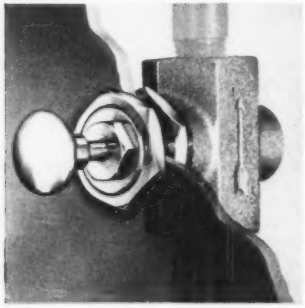
Of interest to dairies and frozen food packers is a new mechanically refrigerated, low-temperature cabinet for both retail and wholesale delivery of foods. Self-contained, it is of 30-gal capacity.

All driver needs to do is plug in unit at night to have it ready to go next morning with a temperature of −20 deg. F. Cabinet has a 30-hr holdover feature to eliminate human element of driver forgetting to plug in cabinet after a day's run. In such case, unit can still go out second day and return with products in protected condition.

Maker says unit will fit all trucks standard to industry for delivery of milk. Designed for compactness, it takes a truck floor area of 60 x 18 in. —a width no greater than ordinary milk case. Contents of truck can be stacked against unit without loss of space. Unit fits over wheel housing, minimizing space loss.—*Kari-Kold Co., 263 Briarwood Avenue, S.E., Grand Rapids, Mich.*

Circle 118A on Reader Service Card

Control Push-Valve Is Self-Closing



For installation in gas and air lines, this self-closing push valve is designed to provide manual control of an intermittent flow where there must be no leakage through the valve or around the valve stem.

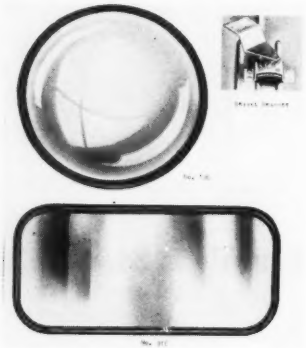
Applications include the following: Use with hydrostatic gages and other instruments requiring a manually controlled blast of air, blowing out or purging of lines, and operations in processing requiring an occasional shot of gas or air.

Valve is opened by pressing a knob on stem, and it closes automatically when knob is released. It has no compression packing and requires no adjustment, being sealed by Neoprene O-rings. Latter are readily accessible by removing a nut and lifting out valve stem.

Valve is available in two styles—Model PV (illustrated), for mounting on panels of any thickness up to 7/16 in., and Model LV for in-the-line mounting. Inlet and outlet are tapped for ¼ in. pipe, and direction of flow is shown by an arrow. Discharge rate is 25 to 30 cfm. at a pressure drop of 100 psi.—*King Engineering Corp., Box 520, Ann Arbor, Mich.*

Circle 118B on Reader Service Card

New Industrial Mirrors Install, Adjust Easily



These new Klear-Vu Safety Mirrors for industrial use are readily installed and adjusted at any desired angle.

They are especially designed for use in factories where blind corners, cross aisle intersections, entrances, and exits present a traffic safety problem. Installed at a height of 8 to 10 ft., mirrors will clearly reflect movement of oncoming floor traffic from different directions.

Diameter dimensions of two circular convex mirrors offered are 12 in. and 18 in., while the two flat rectangular models 9x18 in. and 16x24 in.

The mirrors are also adaptable for use on various types of production machinery and equipment.—*Lester L. Brossard Co. 540 Michigan Ave., Chicago 11.*

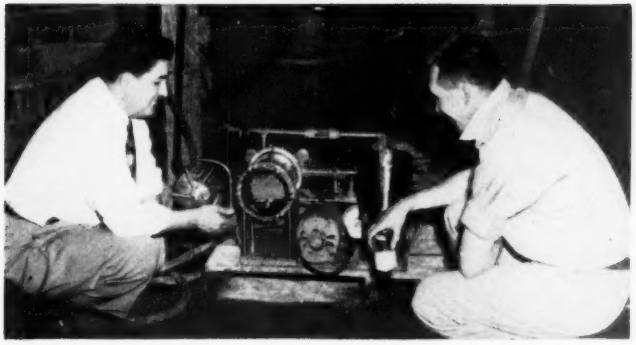
Circle 118C on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard just inside the back cover. Then sign at the bottom and mail. No postage is needed.

For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.

Pilot Pressure-Filter Duplicates Big Unit



A new miniature pressure leaf filter is now made that has the same features as the production filters, even to pump, pre-coat mixing tanks, and quick opening door.

Unit permits try-out of product in a test before buying a full production model. Operator simply mixes some of material to be filtered with the aid in pre-coat tank of this test unit, coats the leaves, and then starts the flow and runs it for a full cycle. He can either draw the product to be filtered directly from a tank or can "cut" the test filter into a by-pass on the main production line. Pre-coat tank functions, in meantime, as a slurry tank.

Duplication of large production filter action is stated to be so exact that selection of filter media can be studied and determined accurately—*Hercules Filter Corp., Paterson, N. J.*

Circle 119A on Reader Service Card

Pumps Save Space, Cut Supervision

Minimum attention and maintenance and reduced floor space are reported resulting from improvements recently made in an existing line of small, single-stage, double-suction pumps.

Designated as Class DMV-DHV, the pumps now incorporate double mechanical shaft seals with sealed, prelubricated ball bearings. Built in 3, 4, 5, and 6 in. sizes, the DMV (for medium heads) and the DHV (for high heads) are designed for general hydraulic services at temperatures up to 200 deg. F, capacities to 2,100 gpm., and pressures to 150 psi.

Use of a double shaft seal affords more efficient sealing and prevents air leakage into pump when operating under suction lift. Longer service life under conditions when the pump is handling gritty and abrasive liquids is reported for the double seal, since external sealing liquid is injected to seal box under pressure—lubricating seal faces and preventing gritty fluid from reaching them.

Cartridge type ball bearings are packed with lubricant by manufacturer and require no further attention.

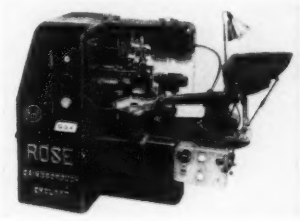
Casing design has been made more compact and simplified in these pumps, with hydraulics and efficiency termed higher. Elimination of stuffing boxes has decreased shaft length between bearings, making shaft more rigid. Shaft is not threaded, reduced, or slotted at any point over its unsupported length. Impeller is attached by a shrink fit.

Through standardization, three spare parts kits serve all eight pumps in line. Kits contain all parts any mechanic would require to restore pump to its original performance.

Materials used in pump construction for non-corrosive service are cast iron (casing), carbon steel (shaft), and bronze (impeller).—*Ingersoll-Rand Co., 11 Broadway, New York City 4.*

Circle 119B on Reader Service Card

Machine Twist-Wraps 360 Pieces Per Min.



This new high-speed, automatic-feed AMF Rose H.S.T. machine is a twist-wrapper designed for handling preformed candies at a rate of from 360 to 400 pieces (round type) per minute.

Operator's skill in hand-feeding is reported to be only limiting factor on speed at which irregular shapes can be wrapped. A wide variety of sizes and shapes can be handled.

A variable-speed control feature permits ready adjustment to required speed, and a one-shot pressure-oiling system simplifies lubrication and minimizes maintenance. Of English make, machine is available through—*American Machine & Foundry Co., 511 Fifth Avenue, New York City 17.*

Circle 119C on Reader Service Card

NEW! PATAPAR 27-21T
light in weight . . .
. . . high in grease-resistance

Patapar 27-21T is a new type of Patapar Vegetable Parchment that is light in weight (27-lb) and – in addition to wet-strength – *extremely grease-resistant.* In actual commercial use, Patapar 27-21T has shown greater resistance to grease and oil penetration than conventional grease-resisting papers of much heavier weight. It offers improved packaging at lower cost.

← NO GREASE "crawl"

This test will prove it. Place 5 drops of oil on a sheet of Patapar 27-21T. The drops will not increase in size. They do not spread or "crawl." On a conventional grease-resisting paper the oil drops will crawl and spread noticeably. Patapar 27-21T stops grease "crawl" *completely.*

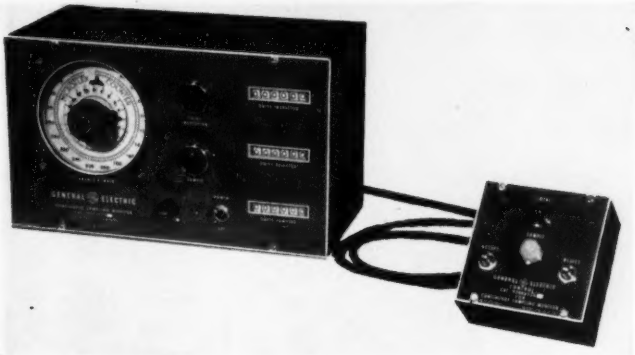
Many important uses

As a wrapper for lard, shortening or margarine Patapar 27-21T gives excellent protection. It stays clean – looks appetizing. And it is economical. Because it resists grease staining, Patapar 27-21T is used also as a package insert for coffee, nuts and other oil bearing products. It is ideal as a protective wrapper for oiled metal parts and leather goods. These are just a few of its many applications.

Send for samples

For samples of Patapar 27-21T and more information, write us today. Tell us the use you may have in mind.

Electrical Device Checks Sampling Procedure



Seen of interest to quality control engineers is the development of this "continuous sampling monitor," an electrical device that automatically keeps track of the sampling procedure.

Monitor is specially designed to minimize the paperwork inherent in the continuous sampling methods of quality control.

In operation, a given number of consecutive acceptable units is established by 100 percent inspection. This "clearance" number, and the percentage number to be used for sampling, are determined by the desired average outgoing quality level (AOQL), selected from a set of curves supplied with the equipment.

When the clearance number is reached, sampling begins. The prescribed percentage of units is inspected until an unacceptable unit is found. This defective unit is replaced by a good one and the 100 percent inspection is followed again until the clearance is reached, at which time sampling resumes.

This procedure continues. Each time a reject is found, it is replaced with a good unit, and 100 percent inspection is followed until the clearance number is re-established.

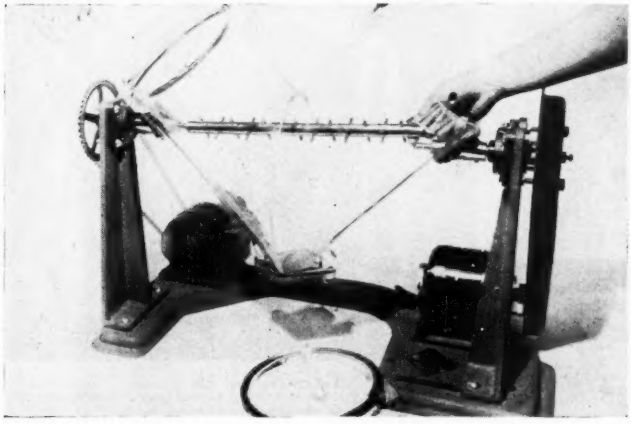
To operate the monitor, the inspector pushes one of two pushbuttons —labeled "accept" and "reject"— after each inspection. He then follows the directions shown by one of two indicating lights, inspecting every unit while the red light is on, and samples while the white light is on.

Briefly, the monitor works in this way: An electric counter, set to any predetermined number from 1 to 400, automatically keeps track of the clearance number. When the counter reaches the set number, contact is broken, and the white sampling light goes on, indicating that the predetermined number of acceptable units has been inspected and that sampling can resume. Percentage inspection or sampling may vary from 1 to 400 percent, the figure depending on the desired AOQL.

The monitor (left in photo) is contained in a small cabinet approximately 12x6x6 in. The control box (right) is located so that the inspector can easily operate the pushbuttons and read the indicator lights. Measuring 4x4x2 in., it is connected to the monitor by a multiconductor cable. Monitor requires 110v. It has a maximum counting speed of 500 units per min.—*General Electric Co., 1 River Road, Schenectady 5, N. Y.*

Circle 121A on Reader Service Card

Rotating Bar Intensifies Blending Action



Thorough efficient mixing is reported with this twin-shell blender, which is equipped with a newly designed rotating "intensifier bar."

Lug-studded bar is designed to improve mixing action by effectively breaking up lumps, dispersing materials which have a tendency to agglomerate, and homogenizing liquid mixes.

Bar is located so that cylindrical lugs acts only on top layer of material being mixed. Rotation of blender continuously supplies fresh material to impact and shearing action of lugs, the peripheral speed of which is approximately 2,500 fpm.

Metal bar is belt driven by a separate motor. Power requirements are termed small, since bar acts only on top layer of material. Bar is removed for cleaning by pushing it toward the spring-loaded end and sliding it from sockets (see illustration).

Twin-shell blenders are available both in acrylic plastic and steel types. Design and construction provides a mixing principle involving a combined tumbling or rolling action with a simultaneous transverse movement within the entire mass of material. In addition, folding action is caused by combining and dividing of entire mass as blender rotates.—*Patterson-Kelly Co., 471 Warren St., East Stroudsburg, Pa.*

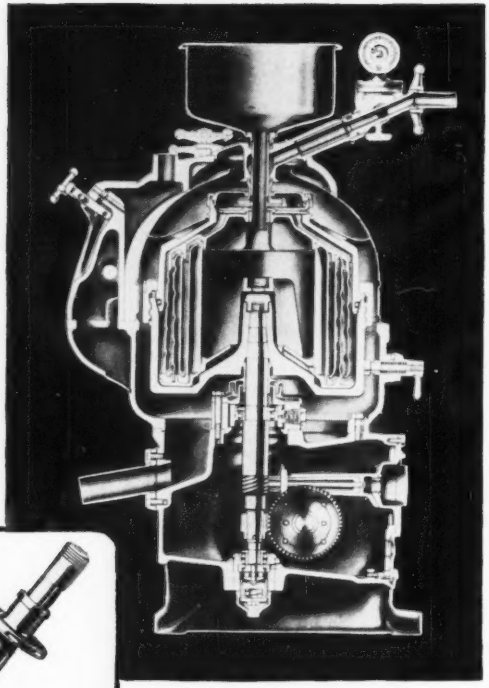
Circle 121B on Reader Service Card

CENTRICO

CENTRIFUGAL CLARIFIERS

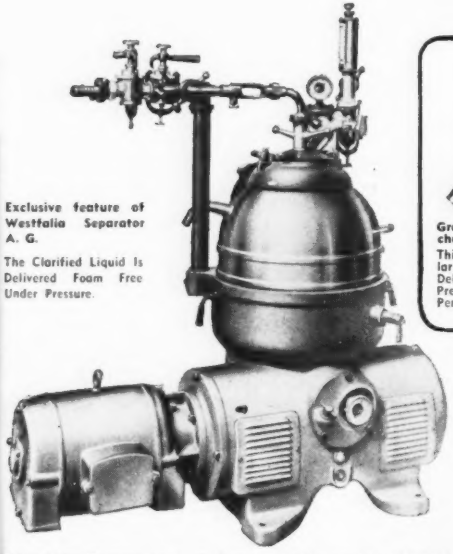
For the Wine, Fruit Juice, Brewery, Dairy and other food industries.

Several models available covering a wide range of applications. Many unusual design features offered by Westfalia Separator A. G.



Cross Section of Typical Separator Manufactured by Westfalia Separator A. G.
This Six Chamber Bowl Clarifies Liquid Containing Solids Of Slow Settling Characteristics.

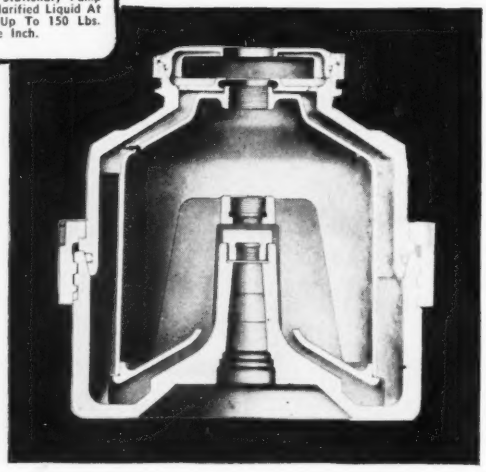
Gravity Feed — No Discharge Pump Required.
This Built-in Collector Similar To A Stationary Pump Delivers Clarified Liquid At Pressures Up To 150 Lbs. Per Square Inch.



Exclusive feature of Westfalia Separator A. G.
The Clarified Liquid Is Delivered Foam Free Under Pressure.

Westfalia Separator A. G. has available models KG-2006, 4006, 8006 and 10006 with capacities up to 3000 gallons per hour in tinned steel or stainless steel type 304, or 316.

Be sure to visit us at the Dairy Show in Chicago at Booth D-6b and at the National Chemical Exposition, Booths 251-2-3. Additional information furnished upon request.



Two Chamber Bowls Clarify Liquids Containing Solids Of Relatively Good Settling Rates At High Centrifugal Gravities.

Sole Distributor for the world famous

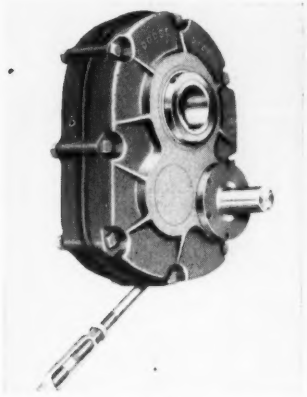
WESTFALIA SEPARATOR A. G.

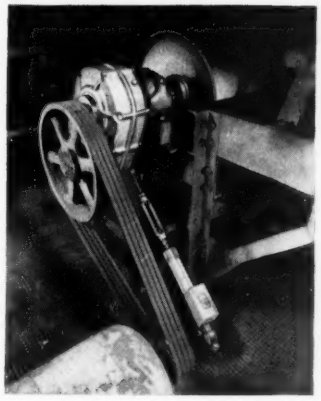
CENTRICO INC.

233 BROADWAY, NEW YORK 7, N. Y.

PHONES: BEekman 3-6789 BEekman 3-6796

Shaft-Mounted Reducer Takes 43 Hp. Loads





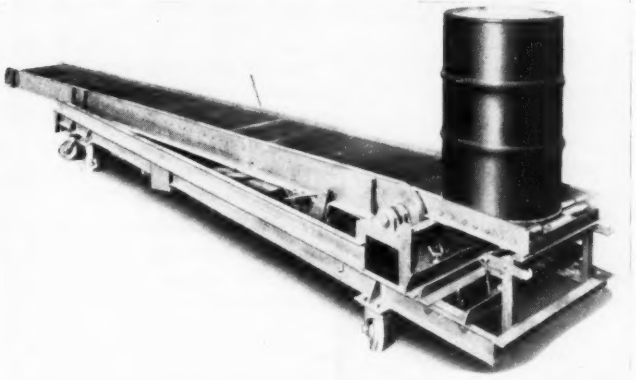
This compact shaft-mounted speed reducer (12 to 110 rpm.) is designed to handle loads up to 43 hp.

Known as the No. 7, the new unit (left photo) is anchored like previously announced models—with a torque-arm that fastens to any fixed object. A turnbuckle enables easy adjustment of belt tension. Installation is said to be simple, since no base or flexible couplings are needed.

New reducer brings number of sizes in the company line to eleven. Divided into two series (single and double reduction), capacities now range from 1 to 43 hp., output speeds from 12 to 330 rpm. Recently announced Tri-Matic Overload Release (right) is applicable to new unit.—*Dodge Mfg. Corp., Mishawaka, Ind.*

Circle 123A on Reader Service Card

Belt Speeds, Eases Moving of Drums From Cars



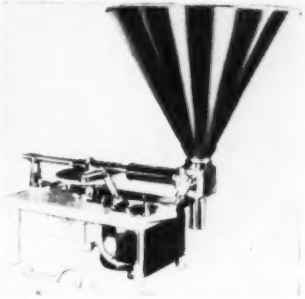
Faster unloading, less physical labor, and greater safety to the workmen are reported advantages of this portable, power driven, belt conveyor of the slider bed type. It is termed especially suitable for unloading drums from either box or gondola cars.

For use with the latter, the boom is raised by an hydraulic lifting device. Boom may be set at any height between the maximum and minimum points of vertical travel. A short roller apron is provided to receive the drums —or it may be used as a transfer section.

Conveyor is 24½ in. wide between side frames and is 22 ft. from center to center of pulleys. Maximum inclination of boom is 11 deg. from horizontal. Belt speed is approximately 40 fpm. Power is furnished by a 1 hp. motor through an enclosed speed reducer.—*Alvey Conveyor Manufacturing Co., 9301 Olive Street Rd., St. Louis.*

Circle 123B on Reader Service Card

Semi-Solids Filler Is Highly Accurate



Jam, mustard, mayonnaise, and similar semi-solids, are precisely filled into containers by this simple piston-unit machine.

Unit can be readily converted, without change of parts, to fill containers ranging from gallon size down to quart size.

Single-shot piston discharges 15 or more fills per minute of desired quantity of material. Capacity of hopper is 40 gal. It requires only a very few minutes to dismantle and clean the machine. It is sturdily constructed, with heavy castings and acid-resistant stainless steel and nickel alloy contact parts.—*F. L. Burt Co., 571 Seventh St., San Francisco 3.*

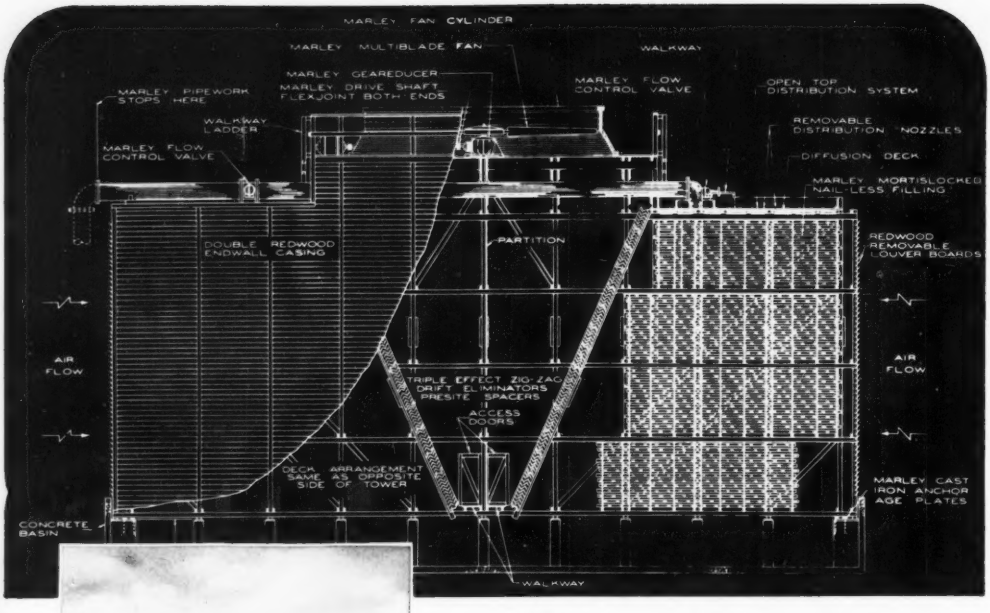
Circle 123C on Reader Service Card

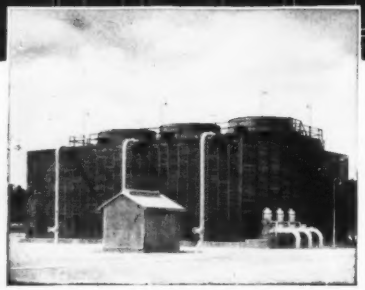
Unit Rapidly Measures Moisture Content

Substantial time savings are reported in employing a new instrument to determine the moisture content of a wide variety of commodities, including cereal grains.

Called a moisture balance, the unit works on a new principle in drying samples by infra-red radiation. It detects the moisture content of a commodity in 5 to 15 minutes, says maker.

A highly sensitive torsion balance is the heart of the device. In operating it, 5g. of commodity to be tested are





for DESIGN and PERFORMANCE

Engineers who know, choose MARLEY Double-Flow

Marley Double-Flows cool 13 billion gallons of water daily . . . more than any other type of tower. The reason why Double-Flows are the outstanding choice of engineers for industrial service is the combination of exclusive features only Double-Flow offers.

Such distinctive design features as open distribution, full height louver walls, MortisLocked filling, rugged structural strength and mechanical equipment engineered exclusively for cooling tower service are the advantages engineers demand and find only in Double-Flows.

These features mean high efficiency performance . . . unique flexibility of operation . . . complete accessibility of all parts of the tower . . safety for operators . . . inspection and maintenance with least possible effort.

Repeat orders are the best criterion of performance for cooling towers, and in industry after industry multiple installations of Double-Flow cooling towers are the dominant rule. Many plants use from two to ten or more Double-Flows and in one industrial organization, 33 of these modern cooling towers are in daily service.

producers of

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DRICOOLERS
AQUATOWERS
NATURAL DRAFT TOWERS
CONVENTIONAL TOWERS
SPRAY NOZZLES
DOUBLE FLOW AQUATOWERS

MARLEY

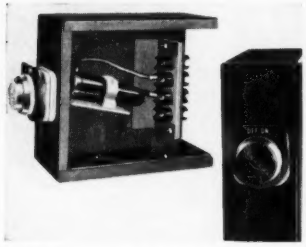
The Marley Company, Inc.

KANSAS CITY 5, MISSOURI

placed in a light aluminum pan inside unit, then infra-red radiation is turned on, and finally weight of moisture loss is shown by torsion balance on a scale calibrated in percentage points.—*Central Scientific Co., Chicago.*

Circle 123D on Reader Service Card

Safety Mercury Switches For Hazardous Areas



This new safety type mercury switch has been developed for use in explosion-hazard locations.

Operating heart of unit is a hermetically sealed mercury switch, mounted on a lever-operated armature. A selector knob or pushbutton inclines armature to actuate switch.

Any possibility of a spark stated is eliminated because of the all-mechanical nature of the actuating linkage.

Designed for vertical panel mounting, the switch is a single-pole, with either single or double-throw action.

On all pushbutton models (left) a spring action returns switch to original position when finger pressure is released. Selector type (right) can be set in either "on" or "off" position.—*Tigerman Engineering Co., 4332 N. Western Ave., Chicago 26.*

Circle 125A on Reader Service Card

Electronics Versus Friction Noises

Seen of interest to maintenance men is a new portable electronic instrument for use in locating friction noises in bearings, pistons, gears, cams, clutches, traps, pipe lines, valves, and other mechanisms.

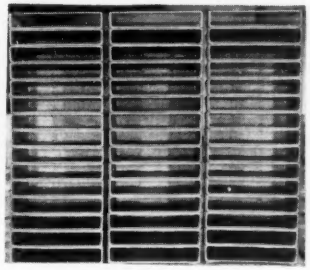
Known as the Elec-Detec, the stethoscope-type device employs a metal probe that "microphones" the exact source of a noise. Thus, it helps diagnose friction trouble, showing where to remedy the trouble.

According to manufacturer, amplifier and sensitivity control on unit make it possible to detect sounds at low speed that otherwise would be heard only at high speeds.

Unit is furnished complete with high-impedance type head-phones, batteries, and leather carrying case.—*Anco Instrument Div., 4254 W. Arthington, Chicago 25.*

Circle 125B on Reader Service Card

Truck Delivery Trays Stack Independently



Need for racks and fixtures in the interior of bakery trucks is eliminated with use of these glass fiber delivery trays for bread and cakes.

The lightweight trays stack parallel without use of additional hardware. Colors are molded throughout tray. Name of bakery is imbedded on two sides between layers of glass fiber and will remain intact for life of tray. Photos show open end style tray.

Use of trays is stated to cut down pilferage, enable operator to see at a glance amount of merchandise, and permit reaching into bottom tray without removing ones above.

Molded in one piece, trays have no seams or crevices that might harbor dirt and germs. They may be easily cleaned in any pan washing machine. Insulating property of glass fiber keeps bread and cake in good sales condition.

Two currently available bread tray sizes (inside dimensions) are: 17⅞ x 28⅜ x 4½ in.; and 20⅛ x 23⅝ x 5¼ in. — *Foster Whitney, Inc., 1175 E. 156th Street, New York City 59.*

Circle 125C on Reader Service Card

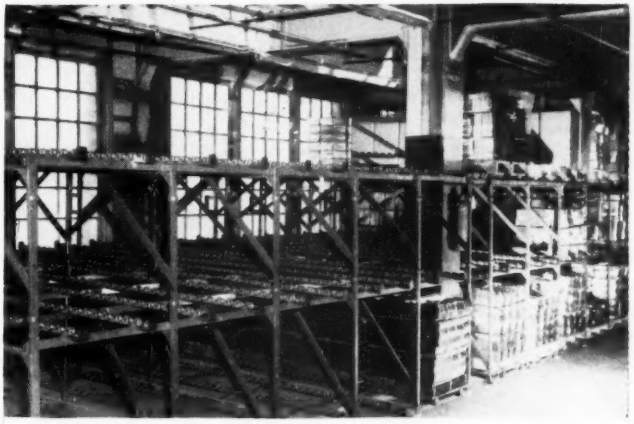
Long-Life, Low-Lube Roller Chain

Little or no lubrication is required with a new roller chain incorporating oil-impregnated sintered-metal bushings.

It is seen especially suitable for food operations where conventional lubrication might damage the product.

Possibilities of the chain were re-

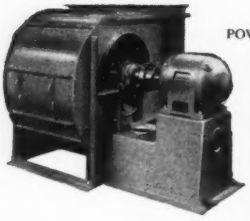
Conveyor-Rack Simplifies Pallet Storing

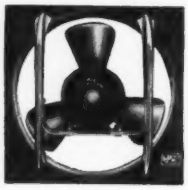


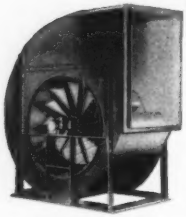
This unusual application of a double line wheel-conveyor rack is saving its user valuable time and effort. It simplifies the storing of loaded pallets by permitting them to be rolled along staggered wheels to the desired position. Combination of wheel conveyor and rack eliminates maneuvering of lift trucks in tight storage areas.—*Harry J. Ferguson Co., 123 West Ave, Jenkintown, Pa.*

Circle 125D on Reader Service Card

AXIAL FLOW FANS

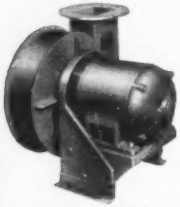

POWER PLANT FANS

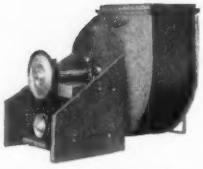

BREEZO FANS

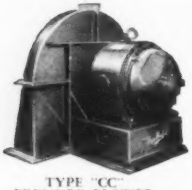

LIMIT-LOAD FANS

VOLUME FANS

75 years of building dependable air handling equipment


TYPE "CB" PRESSURE BLOWERS


BELTED VENT SETS

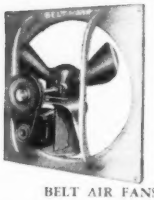

TYPE "CC" PRESSURE BLOWER

RE BLOWERS-EXHAUSTERS

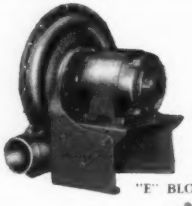
Efficient Air Handling Units
To Satisfied Customers
Since 1877

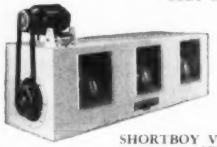
We welcome the opportunity to solve *your* problem.

BABY CONOIDAL FANS


BELT AIR FANS

INDUSTRIAL EXHAUSTERS


"E" BLOWERS-EXHAUSTERS


SHORTBOY VENTILATING SETS

DIAMOND JUBILEE 75TH ANNIVERSARY

"Buffalo" FIRST FOR FANS

BUFFALO FORGE COMPANY

152 MORTIMER ST. BUFFALO, NEW YORK

PUBLISHERS OF "FAN ENGINEERING" HANDBOOK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont. Sales Representatives in all Principal Cities

VENTILATING | PRESSURE BLOWING | AIR CLEANING | COOLING | AIR TEMPERING | HEATING | INDUCED DRAFT | FORCED DRAFT | EXHAUSTING

ported shown in a test where a ⅝ in. pitch, oil-impregnated chain was installed on 19-tooth and 45-tooth sprockets, having a center distance of 8.75 in., and then put through a grueling run, a 10 hp. load at 1,900 rpm.

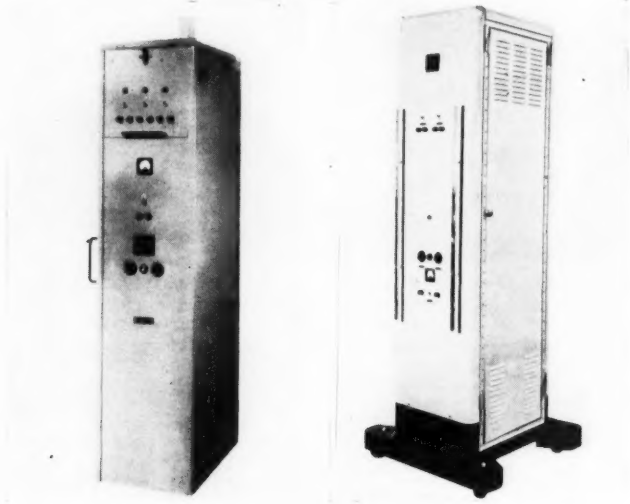
At the end of 20 hr. operation, the new oil-impregnated sintered-bushing chain showed a wear or elongation of only .080 in., says the maker, indicating a notable increase in anticipated service life.

In other instances, the new chain drives, minus lubrication, operated very well in areas containing considerable grit or abrasive material.

Application of the new chain will be subject to engineering approval by the manufacturer.—*Whitney Chain Co., Hartford, Conn.*

Circle 125E on Reader Service Card

Speed, Efficiency Mark Electro-Mechanical Sorter



Almonds, peanuts, coffee beans, peas, and numerous other food products where color is indicative of quality, are reported quickly and thoroughly sorted by a revolutionary new electro-mechanical selector.

Called "Gromax," the compact, simply designed unit performs automatically. A battery of 50 machines can be operated by one supervisor.

The machine incorporates sub-assemblies, which can be removed and interchanged in minimum time. Highly mobile, whole unit rolls in and out of production line without effecting remaining machines, states maker. And necessary maintenance can be performed during actual production by servicing alternate machines while the battery is operating. Each machine is a unit and is not dependent on the group or battery.

In operation, three photo-cells scan the object passing through the unit. Articles to be selected are scanned while falling freely, and the entire surface is viewed against a comparator. Illumination comes from low voltage bulbs positioned so that no direct light can fall upon the photo-cells. This eliminates danger of damaging the emissive surface, while giving a full field of illumination without possibilities of shadow effect.

Main electric supply is centered on switch panel (top of machine) containing the feed control, the main switches supplying the amplifier power supply, the power amplifier, and the "on-off" for the feed. Below this is the light-efficiency indicating meter and the low tension switch controlling lights and filaments. The electronic circuit consists of a pre-amplifier, a stabilized power supply, and a power amplifier.

Two different sorting machines, Type A (left) and B (right), are available. The same principles apply in both, only difference being size and capacity.

The former unit is 5 ft. high, 14 in. wide, and 22 in. deep. Its capacity varies with the size and nature of the product handled, but approximately 30-40 lb. per hr. is termed a basic minimum.

The latter unit is 5 ft. high, 14 in. wide, and 22 in. deep. Here, capacity depends on quality of the sample and degree of selection required, but a minimum of 60 lb. per hr. can be maintained. On good primary quality, states maker, output can be increased to approximately 90 lb. per hr.—*Newman's Inc., P. O. Box 1865, Tulsa, Okla.*

Circle 127A on Reader Service Card

Telescopic Lift Platform Can Stack Over 10-Ft.

Skids and skid bins can be quickly stacked higher than 10 ft. with use of this new, telescopic lift platform, powered hand truck.

New 4,000-lb.-capacity Worksaver model has a lowered platform height of 6¼ in, and will lift loads as high as 126½ in. For stability and traction, unit has articulated frame that permits continuous floor contact of load and drive wheels, despite ramps and floor variations.

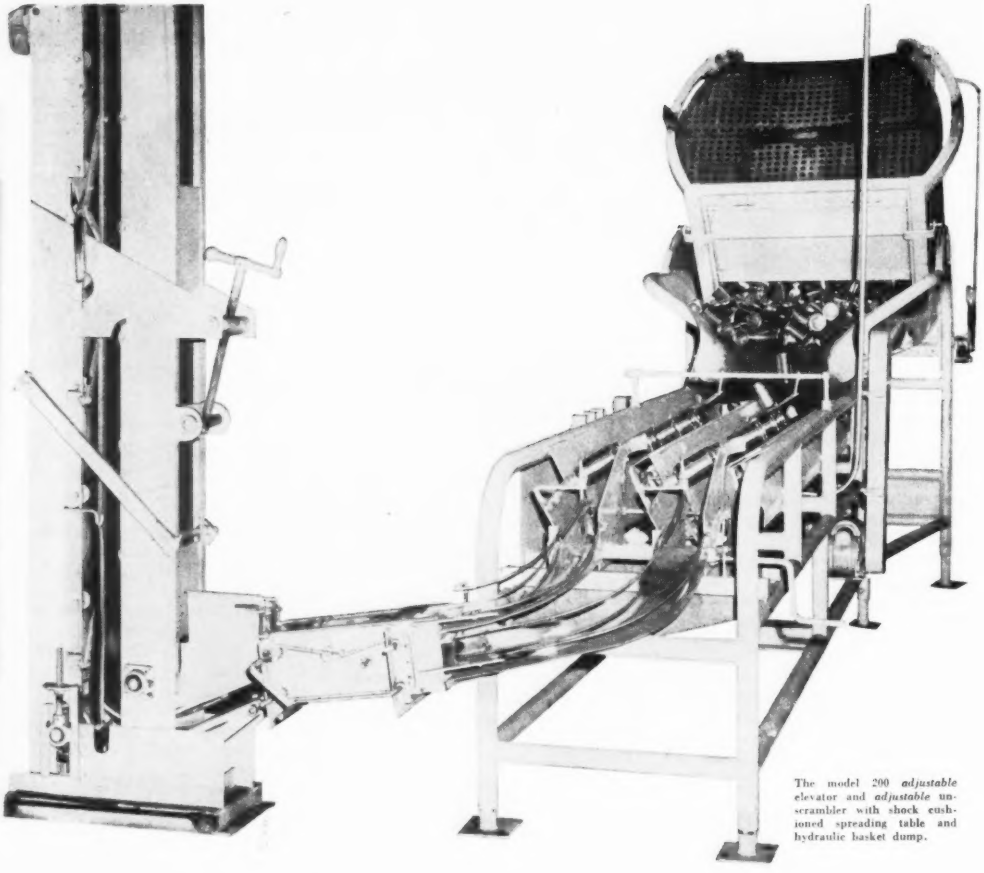
Hoist pushbutton is on operator's control handle. A hand- or foot-operated control, conveniently located on the front of battery compartment, permits adjustable-speed lowering. Twin hydraulic pumps and motors are used for fast lifting. Hydraulic system includes a relief valve to protect the equipment from harmful overloads.

For safety, the truck's brakes are always on and power off when control handle is either in full-up or full-down position.—*The Yale & Towne Mfg. Co., Philadelphia 15.*

Circle 127B on Reader Service Card

DUDLEY MACHINERY CORPORATION

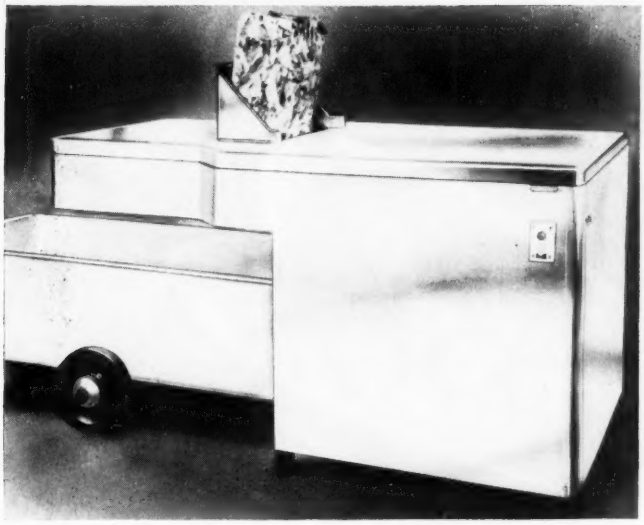
MOUNTAIN VIEW, CALIFORNIA



The model 200 *adjustable* elevator and *adjustable* unscrambler with shock cushioned spreading table and hydraulic basket dump.

To see motion pictures of these installations and the DUDLEY ADVANCE DESIGN empty can unscrambler write - Dudley Machinery Corporation, Mountain View, California

Fast, Safe Slicer for Frozen Meats



High-speed slicing with safety for the operator, is featured in this new hydraulic frozen-meat cutter.

All operating parts are enclosed to eliminate possibility of accidents. Additional safety factors include hydraulic safety valves and an automatic shut-off that prevents overloads.

Machine cuts 26 slices per minute at any desired thickness from ¼ to 3 in., states maker, who calculates unit will pay for itself with the saving in time, labor, and shrinkage in cutting three carloads of frozen meat.

Designed for sanitary operation, machine has a stainless steel hopper and work-table top. Both are removable for cleaning. Knives, knife-mountings, and guide rods are of heavy chrome-plated steel. Interior has no joints or corners to collect meat particles or bacteria and it can be cleaned with live steam or hot water without danger of corrosion.

Slicer is powered by a 3-hp. splash-proof motor (220-440v. 3 phase).—*Morton Frozen Slicer, Inc., 4432 S. Ashland Ave., Chicago 9.*

Circle 129A on Reader Service Card

Baking-Pan Liner Prevents Sticking

A new specially treated pan liner has been developed for the purpose of stopping sticking of yeast-raised goods.

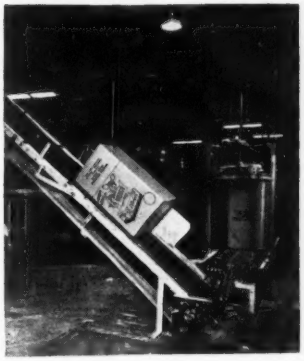
Called 35K-202, it is a sheet designed to eliminate pan greasing, and thus bring substantial savings of both labor and material. Its use also saves much washing of pans.

Another notable feature is that it prevents 'black spots' on yeast-raised products due to carbonization. And since grease need not be used, there is no smoking. Introductory samples are available to bakers all over the country.

The pan liners are available in the 24⅜ by 16¾ in. size (standard bun tray) with square or round corners, as well as with an additional 1-in. side wall. Special sizes can be made quickly to order.—*Sherman Paper Products Corp., Newton Upper Falls, Mass.*

Circle 129B on Reader Service Card

Fingerlike Tentacles Form Belt Surface



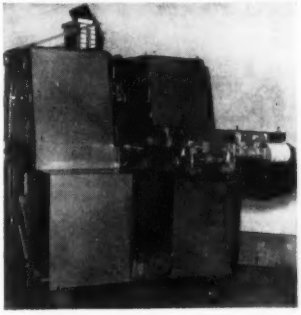
Known as Safety-Grip, this rough-top belting is constructed with thousands of fingerlike rubber tentacles that grip and hold slippery materials.

Belting thus will carry wax-surfaced cartons, ice, and glass containers up steep inclines without slipping or sliding. It flexes over minimum diameters smoothly and easily.

Belt construction is usually 3 plys of duck and a minimum of 5/32 in. top cover thickness of friction surface.—*Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia.*

Circle 129C on Reader Service Card

Unit Provides Packages With Pilfer Check



Through use of pressure-sensitive tape, packages are sealed as a check against pilfering by this compact, automatic machine. It is stated to operate at speeds up to 90 packages per minute.

If package is to be taped on one side, 1¼ in. of material is required per unit; if both sides are taped, dou-

The cold facts behind Swift's Premium Ham

Swift & Company—long famous for its hams, as well as its other Swift's Premium branded products—keeps things cold with Worthington compressors in its plants at Chicago, Cleveland, Sioux City, St. Joseph, Mo., Georgetown, Del., Mishawaka, Ind., Philadelphia and Jersey City.

Other big meat-packing names who also use Worthington refrigeration equipment are: Armour, Wilson, Morrell, Hormel, and Miller & Hart.

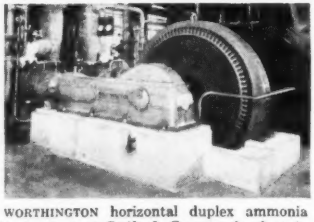
When you call on Worthington for your refrigeration needs, you're assured of the equipment that exactly suits your needs—thanks to the completeness of the Worthington line and its over 100 years' experience with liquid- and gas-handling equipment.

Worthington ammonia compressors, used throughout the meat-packing industry, are available in capacities of 1 to 1,000 tons in *vertical*, *Y* or *horizontal* types. All use Worthington's exclusive Feather* Valves and offer many other features representing the most advanced design in the field.

No other manufacturer makes so complete a line. A Worthington system is all Worthington-*made*, not just Worthington-assembled, for perfect balance in operation and unit responsibility.

Worthington Corporation, Air Conditioning and Refrigeration Division, Harrison, New Jersey.

*Reg U. S. Pat. Off.



WORTHINGTON horizontal duplex ammonia compressor at Swift & Company's plant in Chicago.

A-2J3

WORTHINGTON

Air Conditioning and Refrigeration

ble this amount. Width of tape can be ¼ to 1 in.

Quickly adjustable for different-size packages, machine can be located on end of present packaging line. Only attention required is for operator to put on additional rolls of tape. In action, packages go in on conveyor, are elevated past the tapers, and are discharged at top.

Machine occupies 3 x 5 ft. of floor space. It is stated capable of handling packages ranging in size from a minimum ½ x 2 in. to a maximum of 4 x 6 x 16 in.—*E. & R. Machine Co., Parker Road, Hamburg, N. Y.*

Circle 129D on Reader Service Card

New Tube-Fittings Made of Aluminum

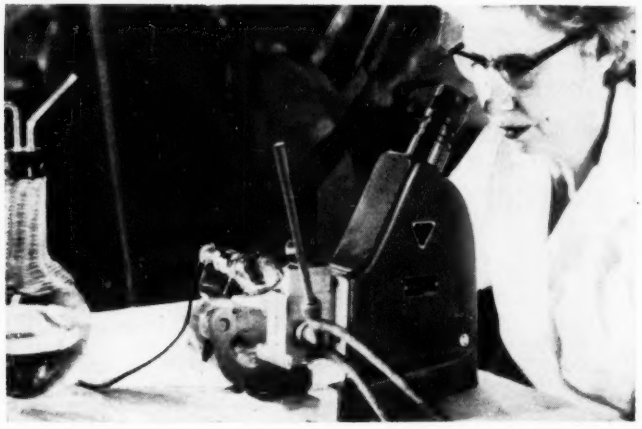
Production of a standard-stock line of aluminum tube fittings, called Triple-lok, for industrial fluid-handling systems is announced.

Line includes male and female connectors, elbows, tees, union and tube-end reducer for ¼, 5/16, ⅜, and ½ in. o.d. tubing.

The aluminum tube (B50S alloy) is highly resistant to corrosion and reaction with fluids handled, and it is available in long lengths. Maker states it has good workability characteristics for easy flaring and bending. Its use holds system weights to a minimum. —*Parker Appliance Co., 17325 Euclid Ave., Cleveland, 12.*

Circle 131A on Reader Service Card

Simplicity, High Speed Mark New Refractometer



Analyses of most products can be made in 10 to 15 sec., it is stated, with this new high-speed industrial refractometer designed for food production line use.

Instrument is reported accurate to plus or minus .0001, and it is designed for everyday applications by workers with only ordinary training. There are no adjustments to be made and no moving parts.

Refractometer is tailor-made to any one of seven specific ranges (built into the instrument to the user's specification). According to scale selected, readings are in terms of refractive index or percentage of dissolved solids.

In use, operator simply places a normal amount of specimen on the top-loading horizontal prism and looks into a single eyepiece. A built-in color compensator gives a sharp dividing line on the fixed eyepiece scale. When prism box is open, both prisms lie horizontally and in position for quick, easy cleaning.

Prisms are set in a special cement stated to be impervious to food acids. This gives a hard, easily cleaned surface to prevent contamination of new samples by any residues of previous specimens.

A spiral-flow temperature control chamber allows stable heating of prism assembly and maintenance of up to 100 deg. C. temperature. Included is an illuminator that plugs into 115v. outlet.

A housing covers the scale and all internal parts to protect them from damage from dust, fumes, or stray liquids. Instrument is finished in durable gray lacquer to resist corrosion.—*Bausch & Lomb Optical Co., Rochester, N. Y.*

Circle 131B on Reader Service Card

Over-Under Scales Are Fast, Accurate

Speed and precision in check-weighing is reported with use of a new line of over-under scales.

New units are available in three capacities: Model 3011 to 5 lb., Model 3021 (illustrated above) to 20 lb., and Model 3031 to 50 lb. There is a choice of either front or side indication.

An acrylic plastic dome on the chart housing admits light from both sides and top, eliminating shadows to make accurate reading easy.

Charts have sharp contrast of black figures on a yellow background with gradients on both sides that can be read from either front or back. Indicator travels one full inch to each ounce, giving high sensitivity and easy readability. Scales are sensitive to ⅛ oz. Portability of unit makes it ready to

What do you do when it takes hours... sometimes days... to change v-belts?

1 **Put one or several maintenance men on the job**

...and pay for repairs while production stands still

2 **Pay overtime**

...and have repair costs eat away your profits

3 **Standardize on VEELOS...**

...and change belts in up to 1/10th the time
...save labor, save time and save overtime
...keep machines producing for maximum profit

Comparison proves the value of VEELOS...

Minimum Inventory—4 reels of Veelos in the O, A, B and C widths can replace up to 316 different sizes of endless v-belts. If you use only one width of v-belt you can stock just one reel of Veelos.

Quick Installation—link construction makes it unnecessary to remove outboard bearings.

Complete Adjustability—vibrationless, full power delivery is assured because uniform tension on each belt in a matched set can be maintained.

VEELOS DATA BOOK

gives complete details on construction, installation and uses. We'll gladly send you a free copy of this 28-page fact-full book... write today.

MANHEIM MANUFACTURING & BELTING COMPANY
605 Manbel St., Manheim, Pa.

VEELOS
THE LINK
V-BELT

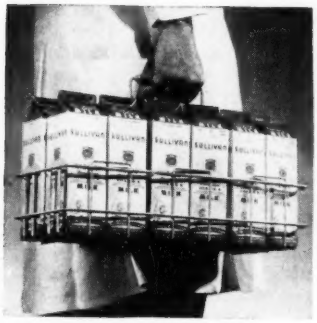
ADJUSTABLE TO ANY LENGTH · ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof, static conducting. Also in double V in O, A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

use under varied working conditions.

A polished stainless steel V-notched beam permits weighing up to capacity without extra weights. Movable poise on beam automatically locks in position after it has been set, preventing accidental movement by bumping or jarring. A matched set of loose weights equal to capacity of scale is available with each model.—*Toledo Scale Co., Toledo, Ohio.*

Circle 131C on Reader Service Card



Paper Bottle Carrier Has Smooth Surfaces

This "No. 637" 12-qt., smooth-surfaced, lightweight, carrier for Pure-Pak, Canco, or Scalright paper bottles has three compartments holding four bottles each.

Several cartons of butter, cottage cheese, ice cream, or other products, will also fit easily in any one of the compartments.

Possibility of damage to cartons in carrier is claimed remote, since there are no sharp edges or rough surfaces.

A sturdy flat floor is provided through use of flat instead of round wire. Spring wire handle is designed for comfortable carrying and safety. Carrier is zinc dipped for maximum sanitation and to make it rust-proof. —*United Steel & Wire Co., Battle Creek, Mich.*

Circle 133A on Reader Service Card

New Chemicals

Powdered Food Flavors Sealed Hermetically

Sealed-in flavors are now being offered for use with dry powdered foods.

They are the result of a recently developed technique called the Sealva process, stated to overcome the oxidation and volatility problem in all types of flavors for powdered foods.

Thus, claims the maker, prepared foods and dessert mixes may now be given quality flavors that taste as strong and as good one year after packaging as when prepared fresh. Basic principle behind the new process is simple.

In essence, the process involves protection (from the atmosphere) of each droplet of flavor oil with a film of vegetable gum. In effect, the gum hermetically seals each minute particle of flavor oil.

According to reports, the process has been so refined that no trace of residual oil is on the outer surface of the coating material. Thus, there is reported to be no possibility for even a portion of the oil to volatilize or become terpeney.

Sealva citrus flavors were left for six months, then were steam distilled. And the oil so obtained is stated to have coincided with the original volume and also to have remained fresh in flavor with no trace of terpeney character. Many other tests, says the maker, have proven the stability of treated products.

Both natural and imitation flavors of all types can be supplied in dry powder form.—*Alva Flavor Laboratories of van Ameringen-Haebler, Inc., 521 W. 57th St., New York City.*

Circle 133B on Reader Service Card

Detergent Removes Milkstone Deposits

Speedy removal of milkstone deposits from dairy and dairy-product processing and handling equipment is claimed when using the new Compound No. 31.

Developed by maker's Dairy Research Div., new material is described as a highly-concentrated liquid detergent possessing ingredients which chemically react with mineral salts making up the "backbone" of milkstone. It is reported to effectively solubilize or disperse these salts by causing them to relax their hold on equipment surfaces.

Once salts have been rendered soluble, removal of fat, protein, and other components, is stated readily effected.

Other advantages claimed include the following: Handling of a variety of jobs because of wide dilution range, ease of application, complete solubility in cold or hot water, and free-rinsing action that leaves no after-films on equipment surfaces. Maker says the recommended solutions are safe to use on stainless steel, copper, aluminum, or glass.—*Oakite Products, Inc., 126G Rector St., New York 6, N. Y.*

Circle 133C on Reader Service Card

Germicide Impregnated In Cleaning Cloth

A cloth impregnated with enough germicide to make 2½ gal. of sanitizing agent, and which can itself be used for swabbing equipment in food and other industrial plants, has been developed.

Called "Rocloth," the new product is made from specially woven, thin cotton fabric. Sheets 12 in. sq. are impregnated with Roccal, a powerful quaternary ammonium germicide.

To make a sanitizing agent, a sheet is immersed in approximately 10 qt. of water, preferably warm, and agitated a few seconds. Resultant agent has a strength of 200 ppm.

Cloth itself may then be used for swabbing plant equipment, also such personal items as footwear, goggles, and respirators, to prevent growth and transmission of bacteria.

It is also recommended for sanitizing vegetable bins, refrigerators, washrooms, and for cleaning eggs prior to packing and shipment.

Sixty sheets are packaged in a stiff fiber carton with a hole punched at top so it may be hung on a wall near equipment.—*Sterwin Chemicals Inc., 1450 Broadway, New York City 18.*

Circle 133D on Reader Service Card

New Aerated Plastic Resists Burning

Newly developed is a formulation of "aerated" Styrofoam stated to have greatly reduced burning characteristics.

New material meets ASTM requirements as a "self-extinguishing" plastic, and according to maker, it should find extensive use, particularly in the low-temperature insulation field.

Now in full production, this polystyrene plastic will be designated as Styrofoam 33. Meanwhile, the maker will continue to supply present white unmodified product.

For purposes of identification, the new product will be tinted a blue color.—*The Dow Chemical Co., Midland, Mich.*

Circle 133E on Reader Service Card

In Behalf of Progress . . .

Chemical Commandments—Paste Them in Your Hat!

Basic principles for evaulating the safety of chemical additives in foods have been spelled out by the Food Protection Committee of National Research Council.

It is impossible to overstress the importance of these technologic guideposts.

Every food technologist and executive should either commit them to memory, or paste them in his hat. Here are the highlights:

It is fundamental that decisions regarding foods be aimed at providing the consumer with an adequate supply of a wholesome product with good acceptability. Such a product must have at least the tradional nutritional values and must be safe under all patterns of consumption.

The distinction must be made between *hazard* and *toxicity*. The latter is the capacity to produce injury. Hazard is the probability that injury will result from the use of the substance in the quantity and in the manner proposed.

Intentional additives should not enter foods until their safety has been established to a reasonable degree of probability, as judged by competent experts.

Experimental studies can reduce to a very low degree the uncertainty of the safety of an additive's general use.

The extent of such studies varies with several factors. Among the considerations are the following:

1. The proportion of the usual diet composed of foods in which the additive may appear.
2. The amount of similar substances in the diet.
3. The amount of the additive technically desirable.
4. Nature and degree of the adverse effect which may result and the class of persons which may be affected.
5. Ease with which people may avoid foods containing the additive.
6. Degree of temptation to excessive use of the additive.
7. Possibility or ease of regulatory control.
8. Technological justification, or necessity, for using the additive.
9. Influence of the additive upon the nutritional contribution of the food in which it may appear.
10. Whether the additive reaches consumers directly or through animals.
11. Possible alteration of additive after addition to foods or consumption by animals.

We are convinced that much progress will come through intelligent use of chemical additives—just as it has in the past. But the use of those which do not contribute real values—or which are not safe beyond reasonable doubt—should never be considered.

Self-Discredited Report

At last we have a report of the Delaney Select Committee on the use of chemicals in foods and the presence of chemical spray residues there.

The report is a sad commentary on certain phases of congressional investigations. It is rightly subject to three criticisms:

1. It is alarmist, and needlessly so.
2. It is nonjudicial, even to the point of weakening the few worthwhile conclusions reached.
3. It appears unusually conspicuous as an effort to prove certain preconceived ideas.

These defects make the report of little practical value. This is unfortunate, especially because the report's main conclusion probably is fully justified—namely, that a modest amendment to the Food, Drug & Cosmetic Act is desirable.

The Committee's reasoning, if one can call it that, finds little support in the technical testimony received by the Committee. From the mass of testimony, the report selects fragments in a most unjudicial manner. The result is alarmist in effect, as indicated by a dissenting member of the Committee itself, Representative Walt Horan of Washington.

In a technical matter like this, such a report is not persuasive. It is not even informative.

Pipe Holes Pose Problem

As all food plant sanitarians well know, openings around water pipes passing through walls or foundations are highly undesirable. Such openings are welcome doors through which rodents and insects readily enter a food factory or warehouse. So sanitarians want them closed tightly with cement.

But a large group of fire-insurance inspectors, who routinely visit all types of industrial plants, are recommending that there be openings around water pipes. Clearance is needed, they say, to prevent pipe fracture because of settlement of pipe or wall, or in event of earthquake.

Obviously the insurance people do not understand the importance of sanitation in food plants. Otherwise they would realize that contamination from rodents and insects is a hazard to a far greater number of people than is the danger of a bursting pipe.

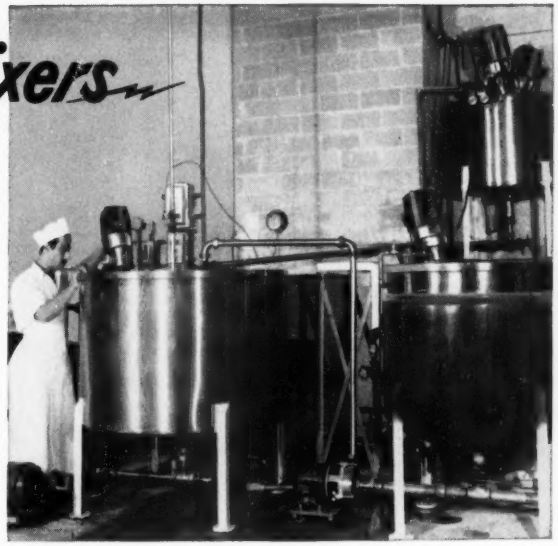
Metal collars might be used around pipes to close openings, yet permit pipe movement. But loose collars collect dirt. Perhaps a pliable, yet impervious, material would make a doubly satisfactory seal.

In any event, some group of sanitarians or public health officials ought to get together with insurance industry representatives. Thereby a minor—but important—difference could be resolved.

Lightnin® Mixers

JOB-GUARANTEED

You don't owe us a cent unless it does the job right

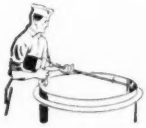


It's easy to *be sure* of good fluid mixing results. Just specify LIGHTNIN Mixers. Every LIGHTNIN Mixer is guaranteed to do the job—and do it *right*—or your money back.

If you're in doubt about the best type and right size mixer for your conditions, we'll study the job and make a careful recommendation, guaranteed to be accurate.

LIGHTNIN Mixers are made in all types and sizes. Shafts and propellers are stainless steel, or practically any other metal you prefer. Some models require oil change once a year; others need no maintenance at all. Hundreds have been in service 20 years and more!

FLEXIBLE. You can use a LIGHTNIN Mixer on any tank or vessel. Switch the mixer to another vessel any time, without expense.



SIMPLE TO CLEAN. No baffles in the tank. Mixer tilts to any angle for quick cleaning. Shaft and propellers are easily removed and replaced.

GET THIS FREE FACT-BOOK ON FLUID MIXING

Shows how to use LIGHTNIN Portable Mixers; how to get uniform double mixing action in any vessel; three types of mixing for different products. Its 28 illustrated pages contain many other useful facts on mixers. Check Catalog B-75 on the coupon, and mail today.

MIXCO

fluid agitation specialists

SERVING THE FOOD INDUSTRY FOR MORE THAN 30 YEARS

PORTABLE
⅛ to 3 HP

FOR
OPEN TANKS
¼ to 3 HP

FOR
CLOSED TANKS
¼ to 3 HP

MIXING EQUIPMENT Co., Inc.

143 Mt. Read Blvd., Rochester 11, N. Y.

In Canada: William & J. G. Greey, Ltd., Toronto

Please send me the literature checked:

- ☐ B-76 Side Entering Mixers
- ☐ B-78 Top Entering Mixers (propeller type)
- ☐ B-75 Portable Mixers (electric and air driven)
- ☐ B-100 Condensed Catalog showing complete line
- ☐ B-102 Top Entering Mixers (turbine and paddle type)
- ☐ DH-50 Laboratory Mixers

Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____

TURN PAGE FOR FOLDOUT FLOWSHEET →

Preparing Jams, Jellies, Preserves

Advanced Equipment Aids Manufacture of Superior Quality Products

EMPLOYING highly engineered facilities in a multi-product operation—processing of jams, jellies, preserves, also table syrups—First National Stores, Inc., of Somerville, Mass., has expanded its production lines, as depicted in the accompanying foldout flowsheet, to meet new swelling demands for its products.

Incoming sugar is dumped into a receiving hopper, from which it is conveyed into 40,000-lb. capacity storage bins. Next, a series of worm-screw conveyors and a bucket elevator deliver the sugar via a scale hopper—Point (1) in diagram—to four 250-lb. bins feeding eight 100-gal.-capacity cooking kettles on the floor below. Feeding of the sugar into the kettles is automatic.

Fruits and juices are held in a 10-deg.-F. freezer. When needed, they are moved to the adjacent tempering room prior to going to the ingredient-preparation department. Both the freezer-storage and tempering rooms are insulated with sheets of aluminum.

Now to the preparation of fruit juices for jellies:

Partially defrosted juices are dumped into jacketed kettles—Point (2)—where they are heated. Free-flowing juice is now pumped to surge tanks equipped with 45-mesh screens. Next, the screened juice goes to a 250-gal. blending tank for complete circulation. Blended juice is then pumped into specially designed batch hoppers. Each hopper is equipped with a liquid-control system for automatic batching of the juice in cooking kettles on the floor below.

Feeds Either of Two Kettles

Preparation of fruit for seedless preserves is carried out in this manner:

Frozen fruit is defrosted in the same kettles employed for thawing juices. Fruit is next pumped through a finishing machine, where skins and seeds are removed. Pulp then goes to four dump hoppers—Point (4)—from which it is charged into cooking kettles on the floor below. Each bin feeds either of two kettles by means of a swivel-type chute. The dump bins are hydraulically operated.

Fruit acid and pectin solution, used to obtain the desirable gelling of products, are also prepared in the ingredient room—at Point (4). Employed are 100-gal.-capacity, stainless steel mixing tanks equipped with vertical-type agitators.

The batches of jams, jellies, preserves, and table syrup are cooked in kettles—Point (5). Automatic temperature controllers terminate the cooking of each batch. Final soluble solids content of all batches are checked by a chemist employing a refractometer on a special work table in the cooking room. Products are now ready for the packaging department on the floor below.

A high vacuum concentrating system is used for preparing cherry and strawberry preserves—Point (6). Purpose of employing this system is to minimize mashing of whole fruit and thereby supply consumers with a superior product.

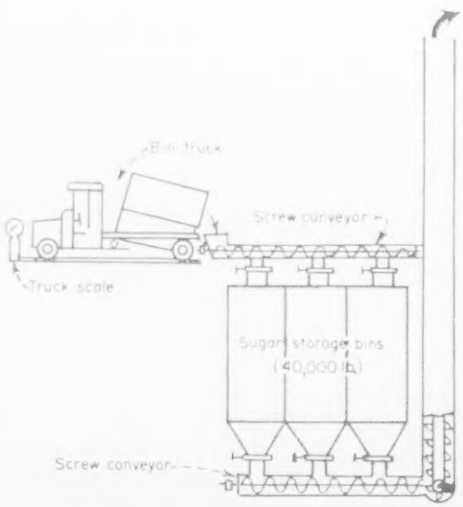
In making the preserves, sugar and fruit are scaled into a 200-gal. floor-level pre-melt kettle. Heated to 130 deg. F., the batch is next fed into the vacuum pan. Here, the preserve is concentrated to the desired solids content by heating under 25 in. of vacuum. After the vacuum is released, pectin and fruit acid solutions are introduced. Then the preserve is pasteurized at 190 deg. F.

Preserves are then gravity-fed into a company-designed cooler. This is a water-jacketed unit equipped with a horizontal-type agitator and an automatic temperature controller. Cooled to 180 deg. F., preserves are then fed into the hopper of the automatic filling machine. The same filler is used for handling jams, jellies, and larger fruit preserves coming from the cooking kettles.

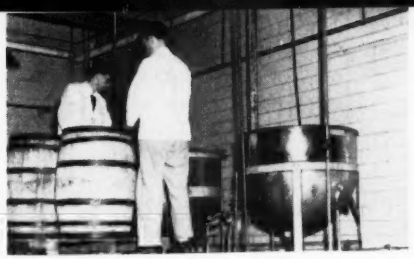
The filled jars are automatically capped, then travel through a continuous cooler. Finally, they are labeled and packed into cases, which are automatically glued and sealed.

The 1952 Way Does It

In the advance-practice manufacture of these popular jam and jelly foods, it's Engineering that takes the bow. You'll read how in this month's special feature article, "Big UP in Output and Quality"—on page 96.

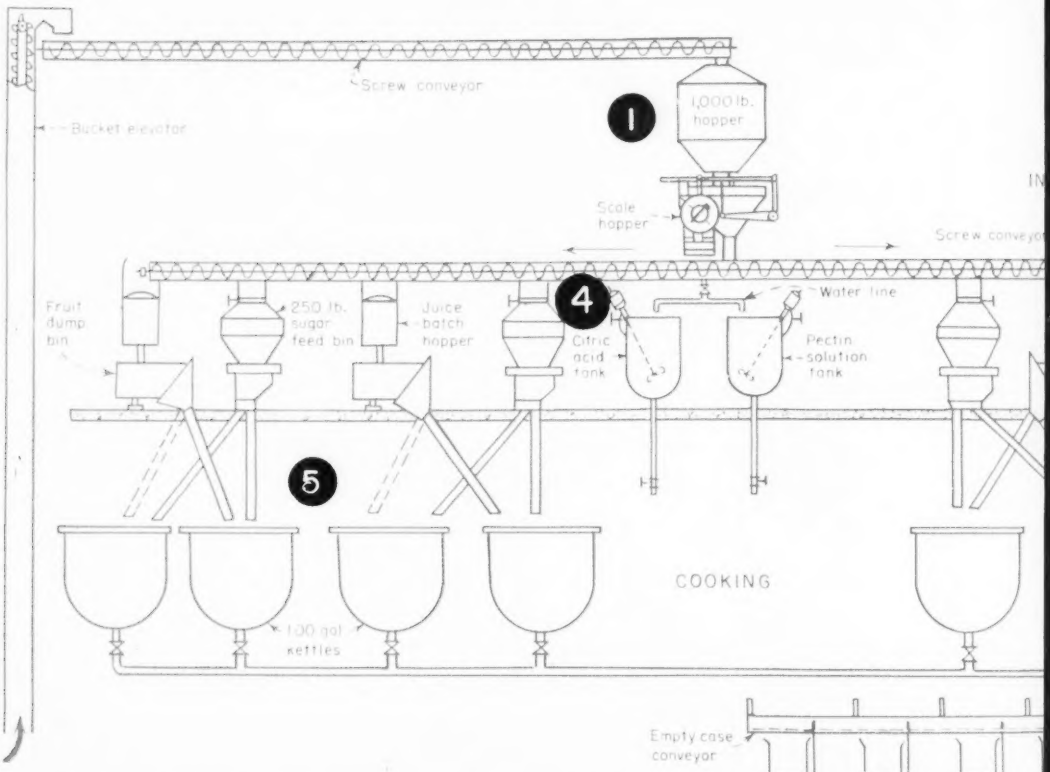


1 **SUGAR** is conveyed via this scale hopper to kettle-feeding bins.

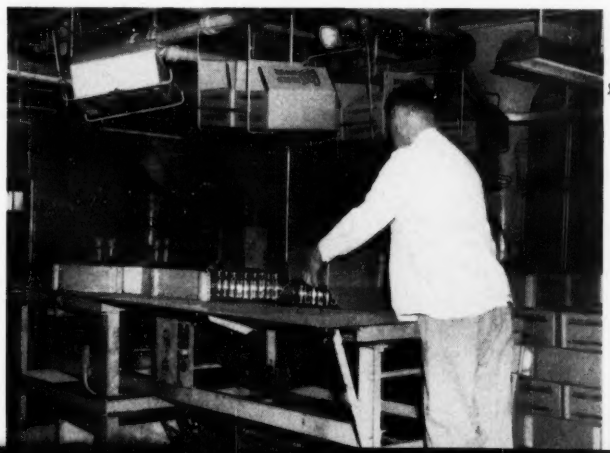


2 **JUICE** for jellies is fed into defrosting kettles, then goes to screening vat.

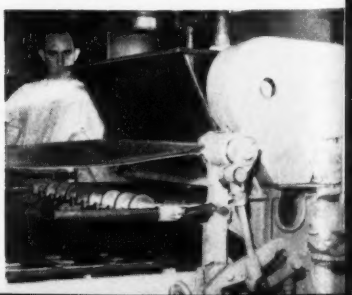
3 **CLEAR** juic
before goin

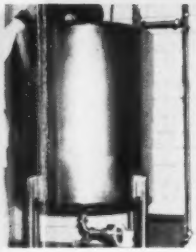


7 **EMPTY JARS** are unloaded onto conveyor carrying them to unscrambler. Conveyor above delivers cases to packers.

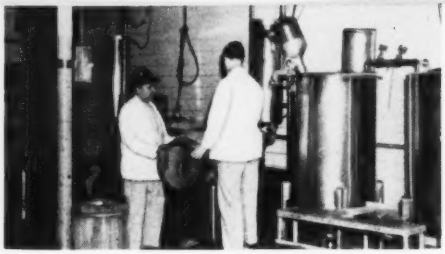


8 **FILLING MACHINE** handles 12, 16, and
Rate: Up to 125 per min.

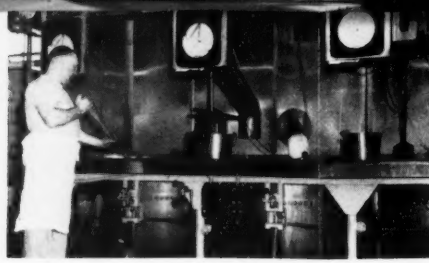




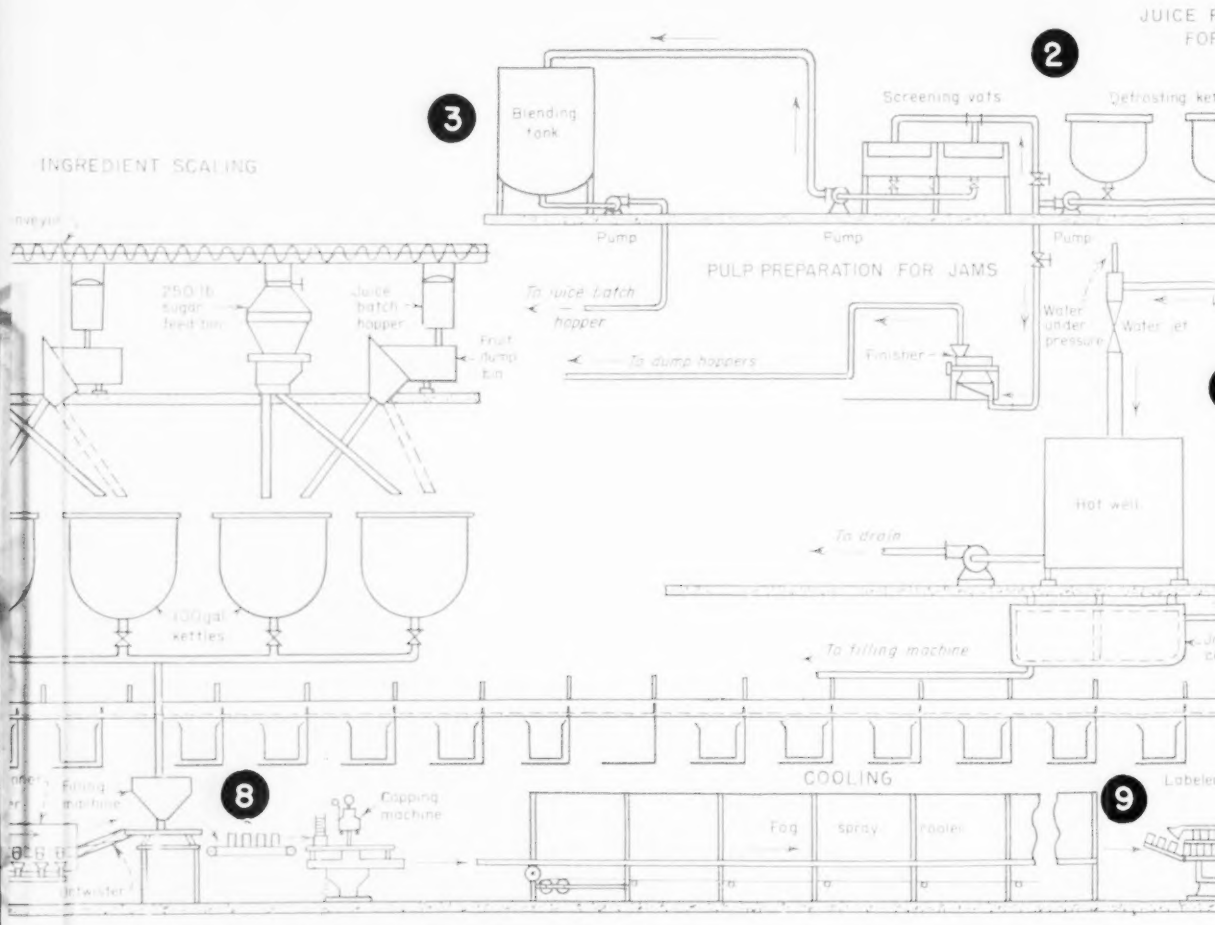
3 juice is blended in vat going to cooking kettles.



4 FRUIT is emptied into specially designed dump bin feeding kettles on floor below.

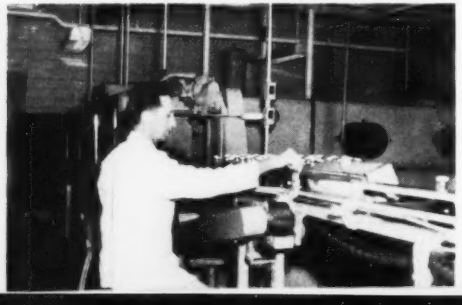


5 BATCHES of jams, jellies, and preserves are cooke in these kettles. Note temperature controllers.



16, and 22-oz. jars.

9 JARS of jellies coming from continuous cooler (background) are inspected before labeling.

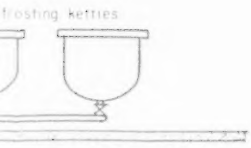


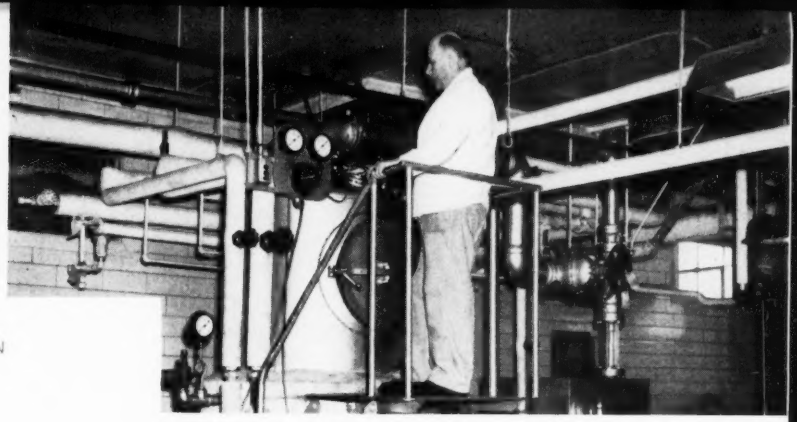
LIST OF EQUIPMENT

Bulk sugar-handling system—Underwood Machinery Co.,
Scales—Toledo Scale Co., Toledo.
Fruit dump bins—Pilot Mfg. Co., Boston.
Cooking kettles—I. Young & Co., Boston.
Fruit and juice defrosting kettles—Lee Metal Products Co
Screening vats—Middlesex Walding Co., Somerville, Mass
Juice-blending tank—Metal Glass Products Co., Belding,
Liquid-control system (for juice-batch hoppers)—Photoswi
Mass.
Pulp finisher—F. H. Langsenkamp & Co., Indianapolis, I
Stainless steel vats for preparing pectin and citric acid so
Products Co., Belding, Mich.
Vertical propeller-type agitators—Mixing Equipment Cor
Flowmeters—Neptune Meter Co., N. Y. C.

es are cooked
trollers.

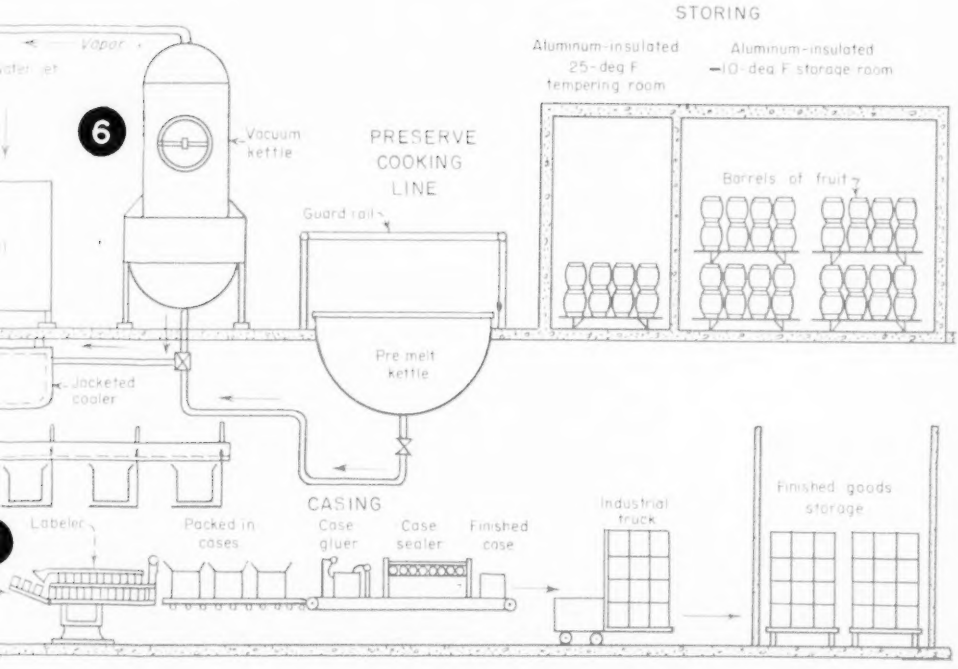
JUICE PREPARATION
FOR JELLIES





6 **PRESERVES** containing whole fruit are concentrated in this vacuum pan. Here, too, batches are pasteurized.

FE PICTURE-FLOWSHEET NO. 44



ENT

inery Co., Boston.

roducts Co., Phillipsburg, Pa.
ville, Mass.
.. Belding, Mich.
—Photoswitch, Inc., Cambridge,

napolis, Ind.
ric acid solutions—Metal Glass

ment Corp., Rochester, N. Y.

Automatic temperature controllers—Foxboro Co., Foxboro, Mass.
Refractometer—Bausch & Lomb Optical Co., Rochester, N. Y.
Continuous preserve cooler—I. Young & Co., Boston.
Preserve pre-melt kettle—Pfaudler Co., Rochester, N. Y.
Vacuum cooking kettle—Pfaudler Co., Rochester, N. Y.
Jar unscrambler—Chisholm-Ryder Co., Niagara Falls, N. Y.
Continuous jar cooler—Barry-Wehmiller Machinery Co., St. Louis, Mo.
Filling Machine—Filler Machine Co., Philadelphia.
Labeler—Economic Machinery Co., Worchester, Mass.
Case gluer and sealer—Standard-Knapp Corp., Portland, Conn.
Capping machine—White Cap Co., Chicago.
Industrial trucks—Yale & Towne Mfg. Co., Stamford, Conn.
Aluminum-insulated storage rooms—C. T. Hogan & Co., Inc., N. Y. C.
Jar cleaner—Chisholm-Ryder Co., Niagara Falls, N. Y.
"Zig-Zag" conveyor for empty cases—Richards-Wilcox, Aurora, Ill.

For Vitamin A–Look to Merck

Large capacity of this new Merck Plant assures an uninterrupted supply of Vitamin A

Merck leadership in vitamin manufacturing assures quality Vitamin A for the food industry.

Merck offers Vitamin A Acetate in vegetable oil, a light-colored product, free from off tastes, eminently suited for use in margarine and other foods. Supplied in batch-size or bulk containers, 200,000 and 400,000 units per gram. For information on other potencies, write to the address below.

Merck's experience of almost two decades in the manufacture of vitamins is offered to help you in the application of Vitamin A to your processes.

Vitamin A, Merck

Research and Production for the Nation's Health

MERCK & CO., INC.
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cut

Cross-sectio
sizes; bolted
joint; flange

The Complete Crane

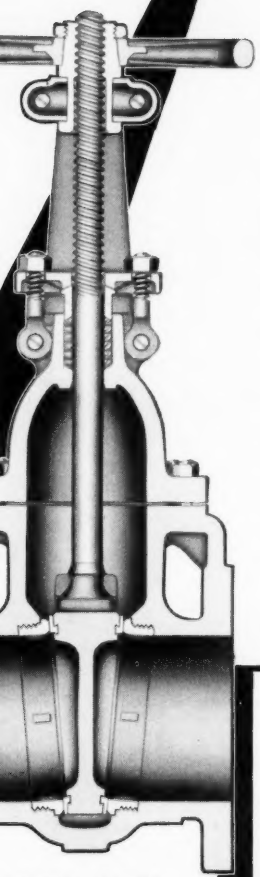
VALVES •
FOOD ENGINEE

cut the high cost of corrosion

IN MANY SERVICES...WITH

CRANE *Ni-Resist*

CAST IRON GATE VALVES



ross-section 4 to 8 in.
izes; bolted bonnet
oint; flanged ends.

Here is a line of "cast iron" gate valves with a special talent for resisting corrosion, erosion and wear. Use them with safety where the strength of ordinary cast iron is adequate—in soda and sulfate pulp mill service—on creosote lines in wood treating processes—for handling sour distillates and crudes in petroleum refining—and many similar services.

Clue to the extra staying-power of Crane Ni-Resist Cast Iron Valves is in their make-up (approximately 14% nickel, 2½% chromium, and 6% copper)—and in their 18-8 Mo Alloy Steel stem and seating faces. Not to be overlooked is the fine Crane design that gives you a strong body and bonnet without excessive weight, a well-proportioned stem with precision-cut threads, a sturdy yoke, and the dependable disc-stem connection that assures smooth operation and tight seating of the solid wedge disc. Ask your Crane representative for full details, or see your Crane Catalog.

THE CRANE NI-RESIST LINE

Working Pressures:
Cold Water, Oil, or Gas, Non-shock
Screwed Valves—225 pounds
Flanged Valves—200 pounds

Available in sizes ½ to 8 in. All have solid wedge disc, with outside screw and yoke. Sizes ½ to 3 in. have clamp type bonnet joint and one-piece bolted gland. Sizes 4 to 8 in. have conventional bolted bonnet joint and two-piece bolted gland.

No. 1671 with Bolted Bonnet Joint, Flanged ends only. Sizes 4, 6 and 8 in.

No. 1670 with Clamp Type Bonnet Joint with screwed ends. Sizes ½ to 2 in. Also with flanged ends 1 to 3 in.

olete Crane Line Meets All Valve Needs. ***That's Why* More Crane Valves Are Used Than Any Other Make!**

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

ES • FITTINGS • PIPE • PLUMBING • HEATING

your control center for sanitation

...walls and floors of Mosaic Tile!

IN TUCSON'S MODERN SHAMROCK DAIRY, bacteriological and product control is conducted in this spic-'n-span quality control room. Sanitary? Naturally . . . the walls and floors are Mosaic Tile!

The durable, tough Mosaic Carlyle Quarry Tile floor resists acids, moisture and dirt. The glazed finish of the Mosaic Tile on the walls improves lighting conditions, provides years of lowest-maintenance service.

Whether you are building or remodeling, find out about the many types of Mosaic Tile before you buy. *They all meet Food & Drug Administration standards of sanitation!* For details, contact our nearest office. For helpful literature, write Dept. 25-10, The Mosaic Tile Company, Zanesville, Ohio.

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(Member—Tile Council of America)

Offices, Showrooms and Warehouses across the nation

Over 4000 Tile Contractors to serve you

Sales Offices: Atlanta • Boston • Buffalo • Chicago • Denver Detroit • Little Rock • Los Angeles • Miami • Milwaukee • New Orleans • New York • Philadelphia • Pittsburgh • Portland • St. Louis Salt Lake City • San Francisco • Seattle • Washington, D. C.

Mosaic Tile helps keep sanitation under control in Quality Control Room of the Shamrock Dairy, Tucson, Arizona.

SPECIFICATIONS: Mosaic Glazed Wall Tile, Colors Nos. 143, 162 and white. Floor, Mosaic Carlyle Quarry Tile in Navajo Red. Malone Tile Company, Tucson, Arizona, Tile Contractor.

"TASK FORCE" of trucks lines up at jumping-off point in Northwest Arkansas for start of run to midwestern markets with loads of frozen chicken. Synchronized scheduling and modern refrigeration insures product's safe arrival.

Trucking Frozen Chickens North

Fox Links Economic Raising Area With Lucrative Selling Area
Running Own Fleet, Properly Refrigerated, Astutely Scheduled

TRANSPORTATION logistics are becoming more important in effecting rapid distribution of frozen chickens from major producing areas to the consumer.

As a consequence, Fox DeLuxe Foods, Inc., made special efforts to develop well-integrated trucking to speed its product to market.

Processing its birds in Northwest Arkansas—an area which lends itself to both economical and quality raising—the company's prime market is Chicago. Additional distribution is in Wisconsin, Michigan, and sometimes as far north as Minneapolis. The Chicago haul is about 630 mi. and takes, on the average, 28 hr.

The company's two plants are in Springdale and Rogers, Ark., where the natural advantages for poultry raising include cheap land, plentiful water, a mild climate, and cool summer evenings. Thus, a chicken of the proper type and size for market can be custom-raised, then immediately dressed and frozen to hold its fine quality.

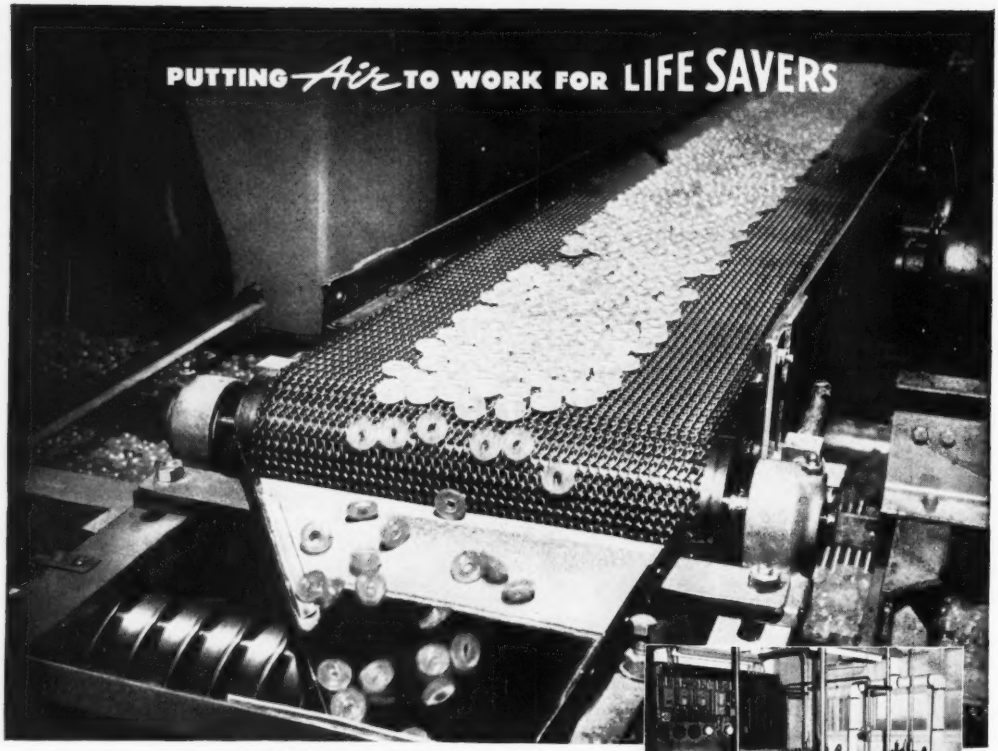
At first, Fox tried shipping its frozen chickens to Chicago via common motor carriers. But this system was not satisfactory for this company because of scheduling difficulties and erratic refrigeration. Quite often the carriers' itinerary would not conform with the production schedule at the plants in Arkansas and costly delays were incurred.

MAIN and branch routes used by fleet in hi-balling chickens north.

These reasons prompted this processor to purchase its own rolling stock. Now it's able to schedule trips north to accommodate the plants as well as arrange arrivals in the market area when conditions are most advantageous. Also, the company has the option of diverting trucks to other destinations, when desirable, by having the loads under its full control all the time.

Another point: Shipping by common carrier didn't give Fox any advertising value from the movement of its products. But with its own transport equipment, the advertising value has been high. The company name is prominent on the tractor cab doors and on sides and rear end of each trailer, together with a large color reproduction of the company's frozen frying-chicken package.

The company is also helping to pay for its new fleet by backloading the trucks on the return trips. Here, it is pertinent that the return load consists of chicken feed to be sold to the raisers in the Arkansas area. Since it takes from 3 to 3½ lb. of feed to produce 1 lb. of live broiler, this market is considerable in the matter of feed tonnage.



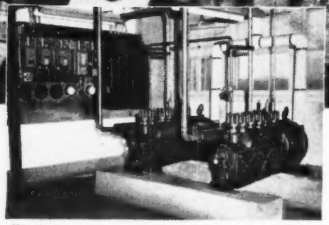
Air Conditioning by: J. P. Salmini Co., Inc., Bridgeport, Conn.

COOL AIR
STEPS UP A FLAVOR PARADE

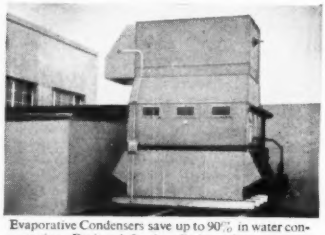
At Life Savers, intricate machines stamp out the familiar "candy with the hole"—3,600 a minute! When formed, the candy drops are soft and pliable. During the critical next few minutes, they must be cooled quickly and evenly.

Westinghouse equipment *puts air to work* for Life Savers by providing chilled air through which the candy drops travel on conveyor belts. In addition, the candy production department is air conditioned. Clean, cool air conditioning by Westinghouse assures the uniform quality for which Life Savers are famous the world over.

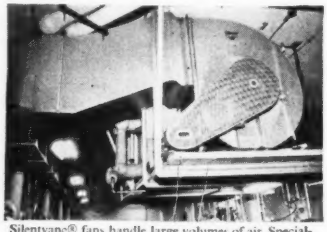
There's Westinghouse Air Conditioning equipment specifically designed to make air work *for you* in food processing . . . whether it's air conditioning, air handling or air cleaning. Call the Westinghouse Air Conditioning Distributor in your classified phone directory, or write Westinghouse Electric Corp., Air Conditioning Division, Hyde Park, Boston 36, Mass.



Westinghouse Compressors are the heart of this cooling system. Hermetically sealed for maximum dependability.



Evaporative Condensers save up to 90% in water consumption. Designed for installation where water is scarce.



Silentvane® fans handle large volumes of air. Specially designed blade wheel delivers non-pulsating air flow.

YOU CAN BE SURE...IF IT'S

Westinghouse

J-80219

Feed is usually shipped from Chicago or Marshall, Mo., a producing point on the route south, to stores in the chicken raising area.

The fleet consists of one conventional International tractor, with engine in front, and a Bartlett refrigerated trailer; and three White, Model 3000, cab-over-engine tractors (with sleeper cabs) and Trailmobile refrigerated aluminum trailers.

Each tractor-trailer makes one complete round trip per week between Arkansas and Chicago. The 630-mi. run north is split at St. Louis, approximately half way between origin and destination, for an 8 hr. rest period layover for the driver.

From Arkansas to St. Louis takes about 10 hr. And from St. Louis to Chicago is another 10 hr., making total elapsed time about 28 hr.

The return trip also takes 28 hr.—the total round trip time being 56 hr. The driver also lays over in Chicago for 8 hr. before starting his return.

This 56-hr. schedule is well within the I.C.C. Motor Carrier Bureau requirements as to working time of drivers. They are not "on" more than 60 hr. in any one week, and they do not drive for more than 10 hr. without an 8-hr. rest period. The 56-hr. week also allows for a delay of 4 hr. for fog, rain, sleet, snow, or mechanical troubles.

Kept Safely Cold

Both dry ice and mechanical refrigeration are employed on the trailers. When the former is used, cakes of the refrigerant are placed on top of the loads.

On the Trailmobile trailers using mechanical refrigeration, the refrigerating means is a large size, Model R, Thermo-King unit capable of constantly maintaining product temperature at −20 deg. F. enroute.

Trailer insulation is Fiberglas—4 in. in the roof, 3 in. at the sides and ends, and 1½ in. beneath the aluminum floor.

Traversed by the Fox company's route are three states—Arkansas, Missouri, and Illinois—each differing on points of motor vehicle law insofar as gross allowable weights are concerned.

Missouri, which employs what is called the "bridge formula" in its gross weight determinations, does not permit as large a payload to be carried on a cab-over-engine tractor-trailer as on a conventional tractor-trailer.

In most states the reverse is true. The cab-over-engine tractor allows more of the load to be carried on the tractor front axle, at which point the conventional tractor is always underloaded.

CLOSE-UP of cab-over-engine tractor and refrigerated trailer used by Fox to move its frozen chickens from economical raising area in Arkansas to lucrative markets in and around Chicago.

All three states have a gross allowable single-axle load of 18,000 lb. and 32,000 lb. for a tandem axle.

As for Illinois, on a four-axle vehicle, two axles on the tractor and a tandem axle on the semi-trailer (such as the White cab-over-engine tractor and the Trailmobile tandem-axle trailer), a gross vehicle weight of 59,000 lb. is allowed (18,000 lb. on the rear tractor axle, 32,000 lb. on the tandem-trailer axle, and 9,000 lb. on the front tractor axle). For the same type vehicle, Arkansas allows 55,980 lb. and Missouri, 56,000 lb.

It would seem that Arkansas was the least lenient, but when Missouri's bridge formula is applied, that state becomes the most critical. Gross weights are limited to *700 times (L plus 40)*, where *L* is the distance in feet between the center of the front tractor axle and the center of the trailer tandem axle.

With the 32-ft. trailer and the White COE (cab-over-engine) tractor, overall length is 41½ ft., or 3½ ft. less than the maximum allowable length of 45 ft. in Missouri and Illinois.

However, the distance between the center of the front tractor axle and center of the tandem trailer axle (or distance *L* in the Missouri formula) is only 31½ ft., notwithstanding the fact that the trailer itself is 32 ft. long.

The reason for this short L is that the center of the trailer tandem axle is several feet in front of the rear end of the trailer, and the front end of the trailer is also in front of the tractor rear axle.

In the Missouri formula, *L* is 31.5 ft. So *L* plus 40 is 31.5 plus 40, or 71.5. Then 700 times 71.5 is 50,050 lb. for the gross allowable actual weight (compared with a Missouri gross weight of 56,000 lb. before the application of the bridge formula). With the tare being 21,780 lb., maximum payload is 28,270 lb.

Some Penalize COE

With the same trailer pulled by a conventional White tractor (where *L* is 36.5 ft.), the gross allowable weight would be 76.5 times 700, or 53,550 lb., and the payload 31,770 lb. This is 3,500 lb. more than with the cab-over-engine tractor.

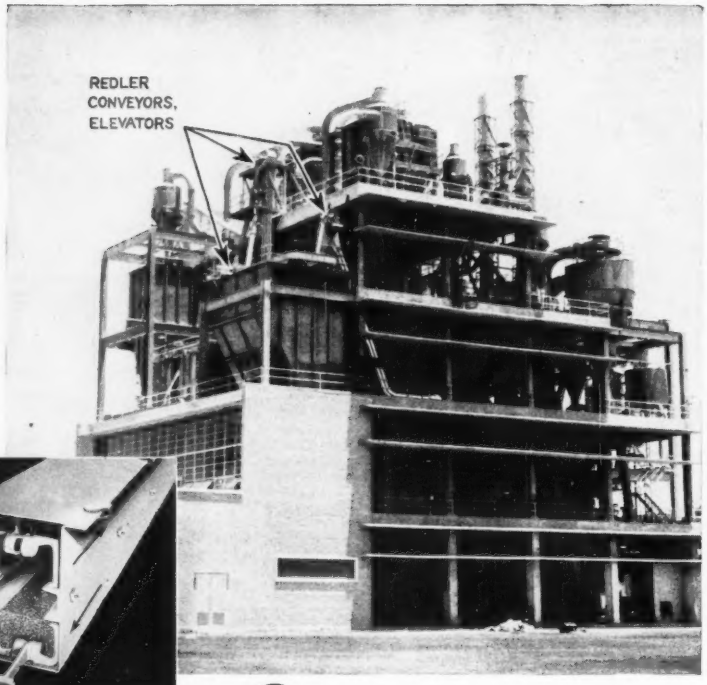
It is thus evident that the COE tractor is not most desirable in those states where the bridge formula is employed.

But in those states not employing such a formula, the COE tractor has the weight advantage over the conventional tractor. It permits a greater net-payload to be carried since the COE tractor carries more weight on its underloaded front axle.

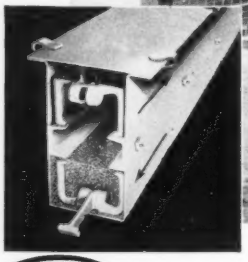
For example, the Fox company's COE tractor-trailer can carry a legal payload of 35,620 lb. in Illinois, with front and rear tractor axle and tandem trailer axle loadings, respectively, of 7,760, 17,990, and 31,650 lb., and a gross of 57,400 lb. The payload of 35,620 lb. in Illinois is 7,350 lb. more than the 28,270 lb. payload carried in Missouri.

A conventional White tractor with the same trailer can carry a legal payload of only 32,980 lb. in Illinois. Front and rear tractor axle and tandem trailer axle loadings, respectively, can be 5,490, 17,610, and 31,660 lb. with a gross allowable weight of 54,760 lb.

Thus, with the same trailer in Illinois, the COE has the advantage in payload carrying capacity.



With the new open-type, no-wall building construction of this plant, the handling equipment had to be sealed and dust-tight to prevent loss or contamination of materials and moisture absorption from a high-humidity location. The fleet of REDLER units used, are designed to meet all handling requirements and afford maximum protection to materials being handled.



Section through horizontal REDLER conveyor casing shows skeleton flights and totally enclosed steel casing.

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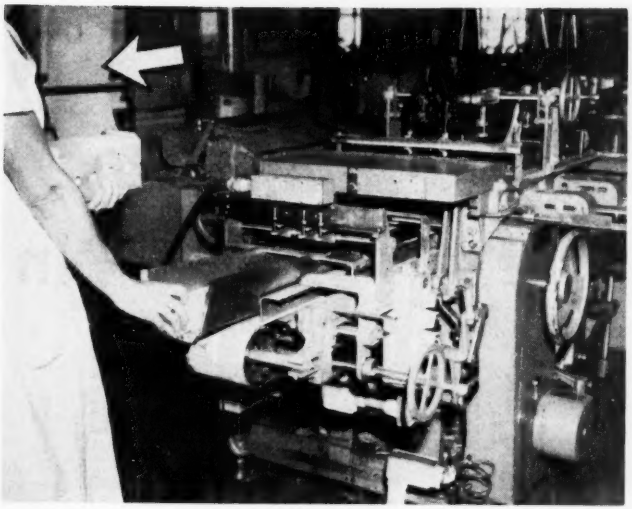
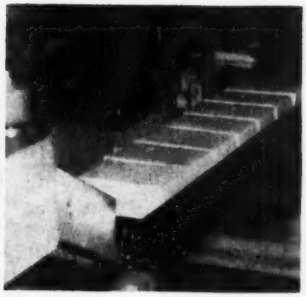
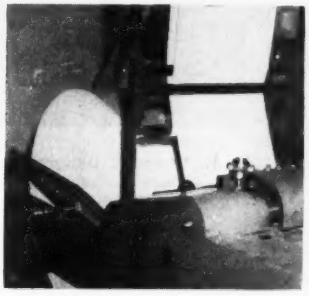


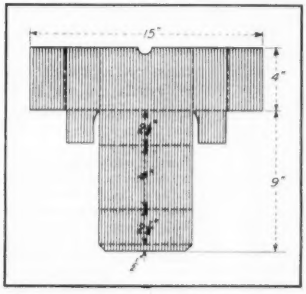
OPERATOR feeds ice cream "dice" into new unit, which then wraps six at a time with insulating corrugated cardboard (arrow).



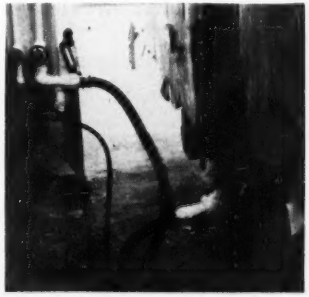
WRAPPED product goes to labeler to pick up printed jacket.



CORRUGATED cardboard insulation is fed to unit from large roll.



TEMPLATE for insulation wrapper that encloses six-dice package.



RR SIDING'S ammonia connections. Plant refrigerant cools plates.

Guards Frozen Product On Long, Hot Runs

Florida ice cream maker engineers quick-wrap insulated cartons, then delivers them safely by cooling trucks and cars with plant ammonia . . . Output up, costs down

WALTER H. HARTE
Assistant Editor, "Food Engineering"

Several company-developed engineering twists have boosted the handling and distribution efficiencies of Plantation Foods, Inc., large ice cream manufacturer at Ulcta, Fla., just north of Miami.

And customer satisfaction has been the major aim in the moves stressing quick and safe deliveries of the Velda brand product to all points in Florida.

Notable among the recent advances are:

▶ **Installation of an automatic machine to wrap corrugated cardboard insulation around retail ice-cream packs at a 60 carton a minute clip.**

▶ **Use of plant facilities to furnish all necessary refrigeration for trucks and rail cars delivering product throughout the state.**

Plantation has long been an advocate of insulation coverings. It wraps its pint and six-"dice" packages (the dice are individually wrapped, cubed-shaped, servings) with a layer of white corrugated cardboard. This thin insulation wrap then keeps the ice cream in eating condition for well over an hour after being taken from refrigerated storage—even in Florida's warm climate.

▶ **Development of a unique packaging machine to continuously cut, wrap, and end-glue these insulators has abolished the costly bottleneck of hand work. And it has enabled the company to expand into new markets with its rugged packs—through achievement of higher production rates with greatly reduced costs.**

The machine itself was an outgrowth of ideas by V. C. Patterson, company president, and Packaging Machinery Co. of Springfield, Mass., builder of the unit. One operator can now handle the entire packing operation at the plant. Also machine

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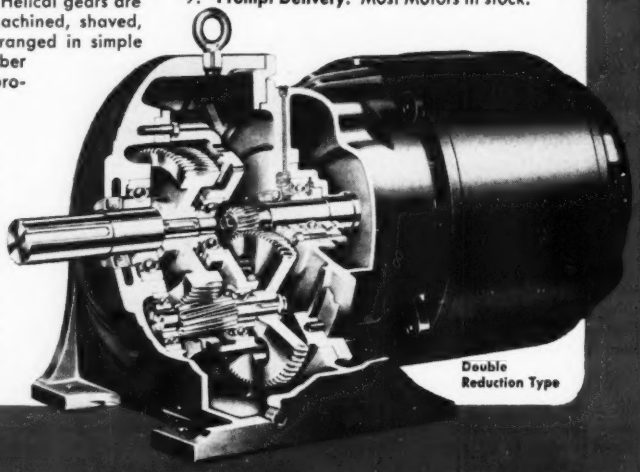
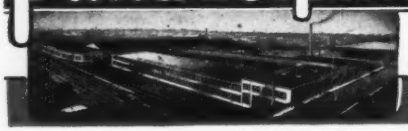


Double Reduction Type

Philadelphia Gear Works, INC.



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changeover from the pint to the six-dice package, or vice versa, can easily be done in a couple of hours.

The corrugated cardboard insulation for the cartons comes in a large 15-in.-wide roll. As the pints or dice are fed into the machine (the dice in three continuous lines) a die cuts the cardboard to shape, and then automatic fingers wrap it around the ice cream.

These cartons are finally fed to another unit—an overwrap machine—which puts the final label over the insulated package. They then go into standard kraft bags for shipment.

Deliveries Streamlined

To match these new production-line advances, the company had to devise newly efficient, yet economical, distribution techniques. And the all-year-'round warm climate certainly didn't simplify this problem. When the present solution was worked out, the part-time idle plant refrigeration equipment was forthwith put to work.

Plant ammonia is now pumped around in Kold-Hold plates in the company's trucks and several special rail cars. These plates are built with channels containing sealed-in glycol-formula brine. The ammonia, in liquid form, is recirculated at 185 psig. through the truck or rail-car plates to cool the brine to below −10 deg. F. Then it is flashed back into the regular low pressure side of the plant system for recompression.

Ammonia manifolds have been built at the truck and rail platforms, so the rolling stock can tie into the plant refrigeration system for convenient, quick, cooling. High pressure hose, equipped with standard ammonia union connections, is used to hook the manifold outlets to the refrigerant plates. Normally, the chilling is accomplished overnight prior to morning loading, but the plates can be brought down to safe loading temperatures in 2 hr. if necessary.

Operational reports have indicated that temperatures of below 0 deg. F. can be kept for 50 hr. in the units on the road with a full product load without any auxiliary refrigeration. When required, however, the plates can be plugged into any plant system with an outside manifold setup.

At present the company is using a number of small, local-delivery trucks, several special rail cars, and one long-distance truck. The complete body on the latter unit, built by Cosmo Body Works of Tampa, is of aluminum and uses Foamglas insulation.

The body is divided into three 10-ft.-long compartments by means of two vertical Kold-Hold plates—each built with a door to permit traffic between all sections. Ten other cold panels complete the arrangement within the body—three on each side (total of six), three on the ceiling, and one on the front end.

This truck delivers product on its regular run as far north as Orlando and west to Tampa—making four stops without a rise above zero.

● ● ●

PANEL IN SESSION. Eight users and eight manufacturers of materials handling equipment are represented. L. West Shea, president, Material Handling Institute, is in left foreground. Next to him is E. Lee Heidenreich, Jr., who posed grain-handling problem. Eight editors were observers, including Frank K. Lawler, editor, "Food Engineering," at left of window.

Handling Problems Solved By Panel of Experts

Efficient methods proposed for unloading malt and corn grits from cars, elevating them 140 ft., moving them into and out of bins, and automatic blending

FE STAFF

"How would you do it?"

That was the question put by E. Lee Heidenreich, Jr., to a panel of 15 other experts on materials handling. Mr. Heidenreich had a bulk-handling problem in a brewery. And he brought it before the unique conference on handling materials in bulk, recently held in Pittsburgh by Material Handling Institute, Inc.

Involving advanced food plant engineering, here is the problem as outlined and the panel's suggested solutions.

Complex Problem

Malt and corn grits are to be handled in a brewery after these products have been cleaned. The materials are to be received by truck or rail, elevated 140 ft. to top of brewery, and distributed to a series of bins that occupy an 80 x 80-ft. floor space. Then the materials will be drawn from the bottoms of the bins, blended, put into other bins, and moved to the processing department.

Amount of malt to be handled is 3,000 cu. ft. per hour, or 60 tons. The volume is the same for corn grits. But being heavier, the weight to be handled per hour is 90 tons.

These are the conditions to be taken into consideration in solving the handling problem satisfactorily: There must be a minimum of rubbing together of particles. No dust at transfer points. And air is to be drawn from each bin at least as fast as the bin is filled, so that no dust is forced out of the bins.

As in all-food handling systems, sanitation is required, and residues of materials in which insects can develop are to be avoided in handling equipment.

In the past, these materials were

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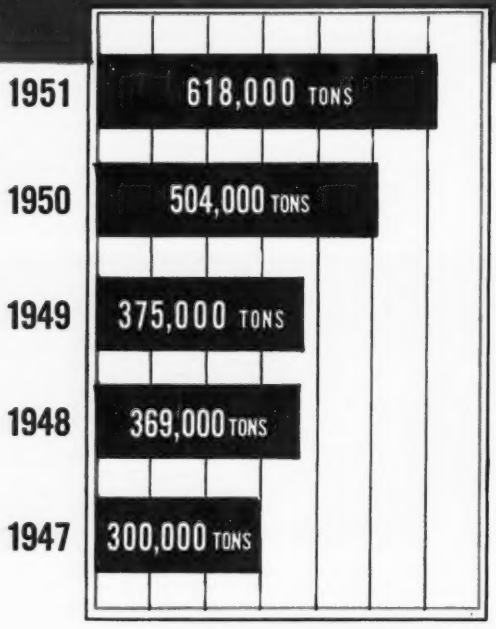

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PIONEERS IN LIQUID SUGAR FOR SAVINGS, SANITATION AND SERVICE

raised to the top of the brewery by bucket elevators and distributed by screw conveyors.

Solutions Suggested

The first answer proposed is the use of an air handling system, operating on the suction principle. This system would employ multiple car-unloading hoses and a vacuum receiver on top of the bins. One riser pipe would handle both malt and corn grits.

Air conveyors also were suggested for moving the material to and from the bins, and it was pointed out that the majority of breweries already are using air conveyors successfully.

Screw conveyors also were proposed for filling and emptying the bins. Although not completely self-cleaning, they are widely used and are commercially satisfactory.

In drawing the materials from the bins and blending, the air handling system would employ metering valves under the bins. Or feeders with variable-speed drives could be used under each bin in the blending operation. This has not been done before in a brewery, but installations are in operation in other industries. As little as 2 percent of a blend may be taken from one bin.

The pressure-type air handling method also was suggested as an answer to the problem. But the point was made that the suction system is more effective for unloading cars and trucks.

It was also noted that the suction of the air system would pull air from the bins at a rate somewhat faster than the bins are filled, creating a partial vacuum and solving the dust problem. This would be achieved with the aid of a rotating air lock with pockets which discharge into the hopper feeding the screw conveyors. If screw conveyors were used to fill the bins, dust from the bins would be exhausted through them to the suction system. Therefore, no dust collectors would be needed.

Vibrating conveyors were considered a third solution to the distribution problem, and these have the advantage of being sanitary. No "dead" material can collect in them and they are easily cleaned. The en masse type of conveyor is still another possible solution to the problem of elevating the materials and distributing them.

In this particular application, gravity discharge of malt and grain from the air system to the silos was rejected for structural reasons.

One phase of this materials-handling problem is the movement of corn grits horizontally to a point 600 ft. from the elevator. This could be handled by an air conveyor, also. One midwest brewery has an 800-ft. carry in its air-handling system. Other conveying

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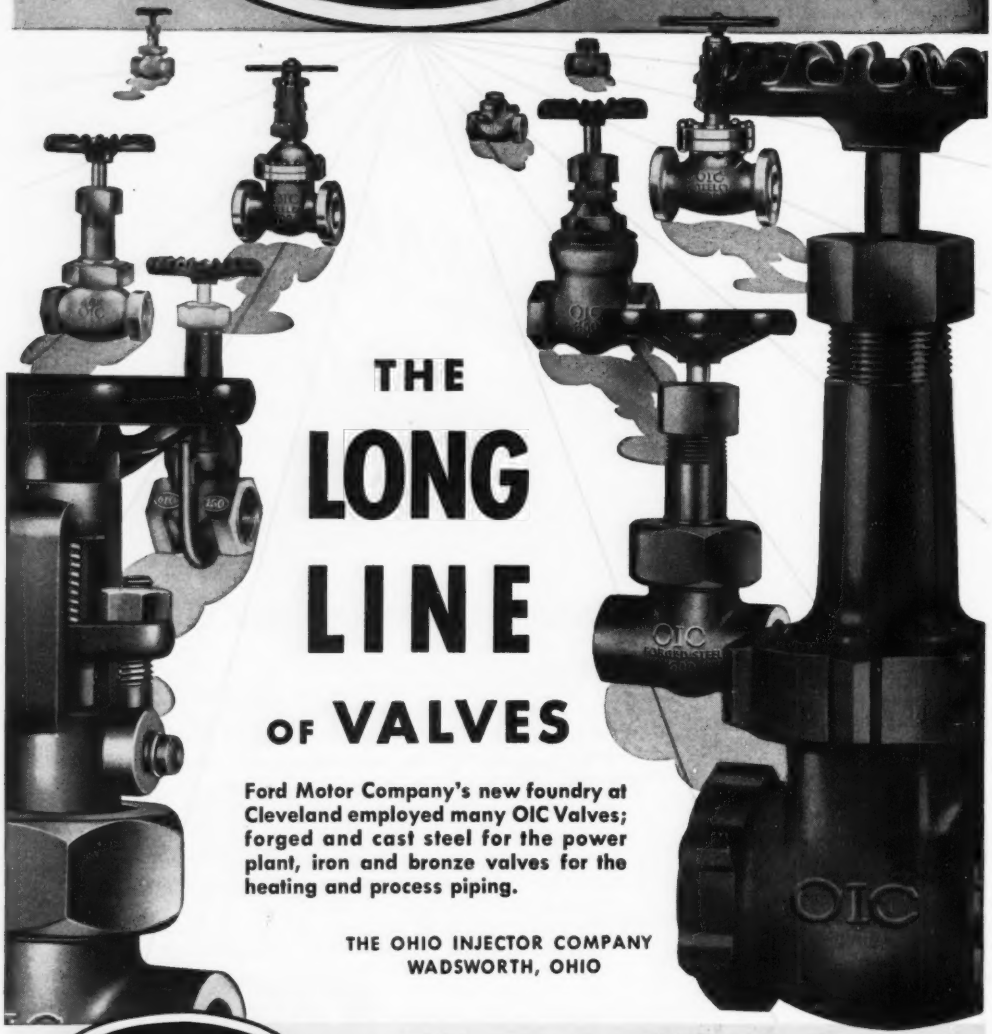

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means could be employed, too, depending upon factors such as the number of obstructions to be bypassed.

—*End*—

Big UP in Output

—*Continued from page 99*

Operators merely throw a switch and the batch is cooked to a predetermined temperature set on the control instrument. When this temperature is reached, the instrument automatically terminates the cook.

Before a batch is discharged from a kettle, its soluble-solids content is checked by a chemist, working on a stainless steel table. Employed is a refractometer for quick reading of solids. Batches are finished to a minimum solids reading of 65 percent for jellies, and 65 or 68 percent for preserves, depending upon variety.

Mounted on the work table is a barometer, which the chemist employs for setting control instruments at the start of the first cook.

In case temperature controller is not functioning properly, batch finishing is carried out manually, the operator shutting off the steam when the desired temperature is reached.

9—Feeding Filling Machines

Also simplified is the task of dumping batches from kettles into the hopper of the filling machine on the floor below. Employed is a high-and-low liquid-level system hooked up to red, green, and amber lights that flash signals to the cooking attendant. When the filler hopper is full, the red light goes on. A green light indicates an empty hopper. And an amber light means that the filling machine is operating.

Each kettle has a knee-high lever mechanism for quick opening and closing of a valve in the kettle discharge.

10—Vacuum Cooking

To retain color and minimize breaking up of whole fruit, a special vacuum-concentrating system has been installed for manufacturing cherry, strawberry, and other heat-sensitive preserves.

For the preparation of whole fruit preserves, fruit and sugar are introduced into a 200-gal. stainless steel, floor-level kettle. After the ingredients are preheated to 130 deg. F., the mixture is sucked into a Pfaudler vacuum pan. Here, the preserves are concentrated under 25 in. of vacuum at about 140 deg. F. Next, the vacuum is broken, pectin and acid solutions are added, and the batch is pasteurized by bringing the temperature up to 190 deg. F.

Preserves are then discharged through a three-way valve into a company-built continuous cooler and holding tank. This is a cold-water jacketed unit equipped with horizontal agitators. Cooling is thermostatically controlled. Partially cooled preserves are continuously fed into the filling machine hopper. Preserves cooked in open kettles also go through this unit, while jellies by-pass it.

11—Pushbutton Control

By operating pushbuttons on a panel located at the filling station, an attendant controls all equipment from unscrambler to continuous

Coming Features in FOOD ENGINEERING

Many more practical articles to aid you in producing highest quality foods at lowest costs are now "on the line" for early issues of FE. Watch for these—

How To Construct Lasting Food Plant Floors

Infestation Control Hits New High With X-Ray Inspection

Rice Bran Oil and How It Is Processed

Trends and Problems in the Meat Industry

Economizing on Power Costs in Malt Plant

Special Meter Takes Dough Mixer's Pulse

Handling Gains Spur New Dairy Plant

Simple, Direct Extraction of Coconut Oil

New Line Turns Out "Sweets" at 250 Lb. an Hour

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cooler. Machines on the line include jar cleaner, filler-feed conveyor, filler agitator, filler, and capper.

Speed of the filler is 125 jars per min., and it can be adjusted to handle 12, 16, and 32-oz. jars or tumblers. Before entering the filler, empty jars are dumped from cases onto the unscrambler. Conveyed single-file from the unscrambler, empties are inverted by a twister and carried through a cleaning unit. Air discharged from 15 jets under 75 psi. blows lint and other loose matter from the jars.

Meanwhile, empty cases are carried from unscrambler to packing station via a "zig-zag" conveyor. This equipment consists of L-shaped wire carriages suspended from an overhead chain belt.

Leaving the filler, jars are conveyed to an automatic White capping machine. Then the jars continue through a Barry-Wehmiller cooler that curbs discoloration of the hot products.

While moving through this cooler at only a few feet per minute, jars are sprayed with a fine mist of cold water from jets under the ceiling of the unit. This operation cools the product to 100 deg. F. or below.

Cooled jars go to an automatic Bee-line labeler. They are subsequently packed into cases, which are automatically glued, sealed, and coded according to variety and date.

End (Resume reading on page 99)

Sausage Canning

—*Continued from page 83*

chutes to service all sausage moving chains in the unit.

Since all plungers move at the same time, eight cans are filled at once and product movement through the machine occurs in regimental fashion. Under normal operating conditions, filling action occurs every 4 sec.—providing a filling speed of 7,200 cans per hour.

Engineering Details

On closer scrutiny, many ingenious engineering details are seen necessary to this smooth operation.

For one thing, since all plungers work at the same time, the conveying chains must move forward in increments and be accurately synchronized with plunger operation. Also, the can bearing wheels—which automatically empty the supply chute and hold each can in position for filling—must be in step with plunger and chain movements.

Total synchronization is accomplished by employing a single variable speed electric motor, with plunger and cam wheel being actuated by a take-off from the cup-chain transmission. A can on the main drive moves the chain assembly in steps.

Air to drive the cylinder plungers is supplied at 10 lb. pressure from the canning line air compressor. This air is loaded on all plungers at the same time by a central valve and exhausted in similar fashion.

Cans going to the unit first pass through a steam-chest type sterilizer, located above the machine, before feeding into the eight chutes. Chutes are discharged as each can falls into a groove in the counter-clockwise rotating can-bearing wheel below. This latter wheel holds the can for filling in the "9 o'clock" position and drops it into a chute when it moves to the "6 o'clock" position.

While chuting from the machine, the filled can is turned upright and is deposited on a conveyor that moves it past an inspector to sealing operations.

Benefits are Many

Perhaps the greatest virtue of the new unit is its ability to produce a truly uniform pack. Each sausage is identical, there being absolutely no variation in length from container to container. Also, weight control is held within 0.1 oz.—a vital factor with this relatively expensive product and its small 3½-oz. container.

Another benefit is the extreme productivity of the machine, permitting Kingan to work this particular canning operation in short, intense spells. However, the variable speed drive and synchronized nature of the unit also allow filling at a very slow rate should there be any holdups before or after it in the line.

Floor area occupied by the machine is surprisingly small. Its length is 6 ft. and width approximately 3½ ft. However, an additional few feet are required for a special operator platform at the feed end. But space is greatly conserved by an overhead system of can feeding and sterilizing.

Three operators are needed to feed the machine. Their job is to simply lay the pre-skinned 23-in. lengths of sausage into the row of eight cup conveyors.

Kingan & Co. has applied for a patent on the machine and has already received notice of allowances for several of its claims. Also, manufacturing rights have been assigned to the Globe Co., of Chicago, hence the unit should be commercially available in the near future.

End (Resume reading on page 84)

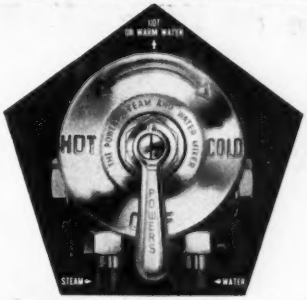
For a Small, Localized Supply of Warm or

HOT WATER

Use

POWERS

STEAM and WATER MIXERS



ECONOMICAL—Quickly pay back their cost. Thousands now in use. *Easy to Install.* Requires steam and water pressures above 10 lbs. Steam is mixed directly with water.

MANY USES—Industrial processes; 180° F. sterilizing rinse water for dishwashers; washing oil drums, trucks, etc.

TEMPERATURE RANGE—Any temperature desired between that of incoming water and 200° F.

HAS PRESSURE EQUALIZING VALVE—which prevents delivery temperature changes caused by fluctuating pressures of steam or water.

SMALL SIZE—½" pipe size can be held in the palm of the hand, has 5" dial; ¾" size has 7" diam. dial.

CAPACITIES—based on steam and water at 45 lbs. pressure each, water at 60° F., and delivery temperature of 160° F.: —½" size =3 gals. per min.; ¾" size=8 gpm. Mixing steam with 140° F. water increases delivery about 75%. Often used as a small booster heater. ***WRITE for Bulletin 358-S***

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THE POWERS REGULATOR CO.
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Please Send Bulletin 358-S and prices

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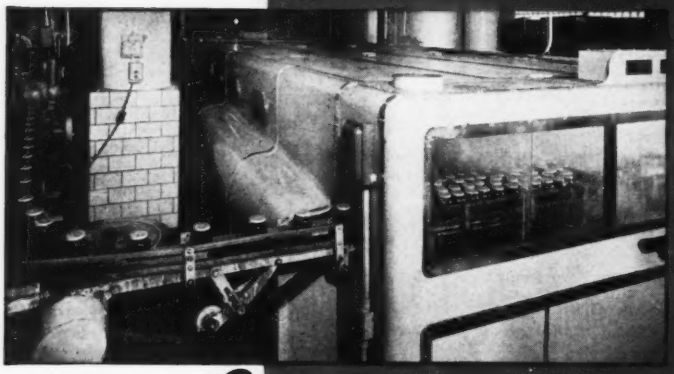
THE VORTEX

ASSURES ECONOMICAL, CONTINUOUS



Automatic Cooling

FOR Louis Sherry PRESERVES, INC.

Packed by Palmer Fruit Products Co.
Long Island City, N. Y.

The "Vortex" method of cooling packaged products greatly reduces operating costs and achieves the positive time and temperature control which a quality product deserves. Entirely automatic in operation, it runs continuously with no operators required.

Heat transfer is accomplished by the famous Barry-Wehmiller "Vortex" system of atomized water sprays. The patented "walking beam" conveyor with two moving grates moves containers through the cooling cycle. Hydraulic drive not only dispenses with chains, gears and cams, but uses less power and holds friction to a minimum. Finger tip, automatic speed control accurately adjusts process time

The "Vortex" coolers, pasteurizers and exhaust boxes have a wide variety of application in the food and beverage field. Write for bulletins and complete information

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NEW YORK

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IN GREAT BRITAIN BW BARRY-WEHMILLER MACHINERY CO. MILL GATE HOUSE WITCHAM JUNCTION, SOMERSET, ENGLAND

387

Pushbutton Liquid Mixing

—Continued from page 71

sheet constitutes instructions for the operator for each separate run.

In the laboratory we compute the necessary weights of each ingredient. In the case of cream, the weight depends on the percentage of fat, and in the condensed on the solids content. A small margin in total weight is allowed for any final standardization that may be necessary in the mix storage tanks.

Ingredients are weighed in staggered groups to facilitate final blending of finished product in the cold-wall tank (see sample make-sheet). All liquids—cream, plain condensed skim, liquid sugar, corn syrup, and water containing the stabilizer—are piped directly to the weigh tank, their flow being controlled by pushbuttons located on a panel beside the scale. The operator has only to weigh out the amounts specified on the make-sheet for each separate draft.

When the first four weighings have been made and the drop tank is nearly full, the operator actuates the pasteurizer and homogenizer. Water is initially used to develop the forward-flow through these units. When the proper temperature is reached in the HTST unit, the water is shut off.

In the meantime, the non-positive centrifugal pump has been started and is cycling the raw mix ingredients from the outlet end of the drop tank and back into the top of the tank—performing the first blending operation.

Mix is started through the process by cracking a valve in the cycling system and thus diverting a part of the flow to the pasteurizer balance tank at a time when this tank is nearly empty of water. Careful adjustment of this valve enables the centrifugal pump (capacity, of 15-30,000 lb./hr.) to supply the balance tank with approximately 7,500 lb./hr. of mix ingredients at 68 deg. F. and recycle the remainder through the drop tank.

Vacuum created by a 1½-hp. positive pump draws the mix from the balance tank through the regenerator section of the HTST unit, where it is heated to 134 deg. F. by the hot mix on the opposite side of the plates. Mix is then pumped through the first heater section, where its temperature is raised to 152 deg. F.

At this temperature, the mix is drawn into the 800 gal./hr. Multi-Flow homogenizer, where it is subjected to a pressure of 1,600 psi. Then it enters the final section of the HTST unit and is heated to 178 deg. F. It flows thence to the holding tube, to remain 25 sec. at this temperature before entering the regenerator section of the plate unit for cooling to 112 deg. F.

From the HTST unit the partially cooled mix flows over a large cabinet-type surface cooler, where its temperature is further reduced to 38 deg. F. A positive, liquid-level controlled pump moves the mix from the cooler trough to the cold-wall storage tanks.

Actual "Make-Sheet" for a Mix

TYPE OF MIX 12% INGREDIENTS USED A.J.M.

WEIGH NO.	CREAM	COND.	LIQUID SUGAR	LIQUID CORN SYRUP	DARK LOID	WATER	STABILIZER	VANILLIN	[illegible]	COLOR	LECITHIN	
1	570		295							2-oz		865
2		374		96	38	357						865
3	570		295									865
4		374		96	38	357						866
5	570		295									865
6		374	194	96	38	144		19				865
7	570		295									865
8		474		96	38	257						865
9	570		295									865
10		630			38	197						865
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
Total	2850	2226	1669	384	190	1312		19		2-oz		9650

FIGURES are jotted on sheet for 1,000 gal. mix. Note how ingredients are weighed in staggered batches to assure relative uniformity.

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Your Cambridge Field Engineer can show you how woven wire conveyor belts combine movement with processing to reduce handling costs, boost output.

Whatever type of food you are processing . . . regardless of whether it is cooked, frozen or fresh . . . there's a Cambridge Woven Wire Conveyor Belt to combine movement with processing, thus reducing manual handling and increasing production.

Cambridge belts can be woven from any metal or alloy . . . including stainless steel to meet sanitary requirements . . . to any mesh or weave. Where needed we can provide special side or surface attachments to hold the product during movement up or down. In processing through liquids . . . washing, blanching or cooking . . . open mesh of the belt permits uniform processing and free drainage of the liquid. For baking or freezing, open mesh of the belt permits free circulation of air within the process chamber.

Your Cambridge representative has available a specially prepared set of flow sheets describing in detail how wire belts are used in meat packing, vegetable freezing, fruit canning, sugar refining, candy manufacturing, brewing, cracker baking, ice cream and other food plants. Call your Cambridge man in soon; it costs you nothing to get his experienced advice. See "Belting-Mechanical" in your classified telephone book or write direct for the name of our man in your territory.

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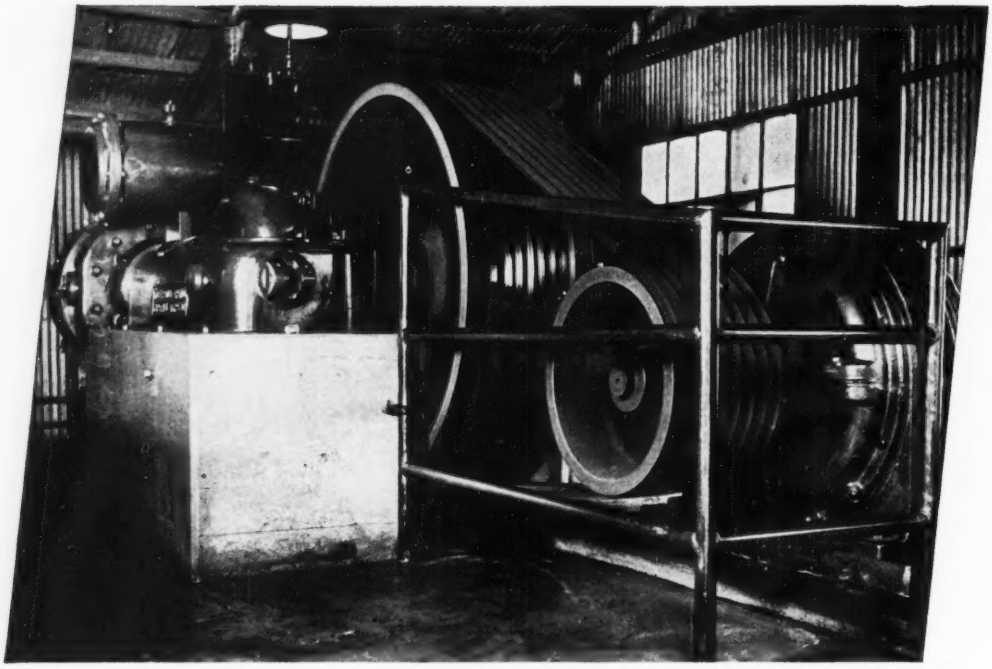
OFFICES IN PRINCIPAL INDUSTRIAL CITIES



Keep your production in the groove with **Thermoid V-Belts**

Production men, in all kinds of industries, rely on the greater strength and longer life in Thermoid V-Belts to provide smooth, efficient performance and long wear . . . keep production in the groove.

From huge multiple V-Belts of rayon grommet construction to the smallest fractional horsepower belts, you can always depend on Thermoid quality.

The result is V-Belts with minimum stretch and extreme flexibility . . . designed to transmit maximum power without slippage . . . able to withstand high speeds and absorb shock.

All these advantages add up to lower operating and maintenance costs, and in the long run, the most economical V-Belts you can specify for the job.

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Final blending is accomplished by agitation in these tanks.

Samples are taken for final laboratory checks on fat and total solids. And if required there is further standardization before the mix is shipped in tank-trucks.

The higher fat mixes are run through the system first, followed by lower testing ones. Change-over occurs when the 40-gal balance tank is about two-thirds empty.

End (Resume reading on page 72)

Bakers' Technical Center

—*Continued from page 90*

ment. The curriculum is designed for three levels of bakery personnel: (1) Top management; (2) key personnel including foremen, plant managers, and production superintendents; and (3) individual production and janitorial employees.

Top management is taught to understand sanitation problems, to appreciate the need for funds in following good housekeeping practices, and to evaluate personnel for capability in carrying out a sanitation program.

Key personnel are trained on procedures necessary to execute this program. Then, with the program established, these plant sanitarians, sanitation foreman, or part-time employees responsible for sanitation, continue to keep the plant in good order.

Individual production and janitorial employees are trained in the sanitary aspects of their tasks.

Bulletins dealing with technological aspects of the sanitation program are distributed, also posters analyzing individual production tasks from a sanitation standpoint.

An entomology laboratory is employed by this department for testing new methods of insect and rodent control. Results of studies are released to provide information to the industry on the safest and most effective chemicals for the control of insects and rodents.

School of Baking

A very important department at AIB is the school of baking, which operates under the guidance of an advisory committee appointed by the board of directors. These committee members have been selected for their understanding of problems covered in training programs.

Eligible for admission to the school are bakers, allied tradesmen, and others. While entrance examinations are not required, the applicant must

Kathabar
MAINTAINS IDEAL PRODUCTION WEATHER IN YOUR PLANT—EVERY DAY —YEAR ROUND
KATHABAR Humidity Conditioning equipment saves money for food manufacturers and processors in these critical operations:
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Does your Production Line have Too Many Starts + Stops?

Some typical applications where Kathabar Humidity Conditioning has permitted *continuous* operations in the food industry are: ★ Bakery product drying ★ Gelatin drying ★ Sugar cooling after refining ★ Sugar-coated breakfast food manufacture ★ Candy cooling with sub-freezing air ★ Coffee, chewing gum, and grain products manufacture.

For cost-minded executives: In many cases, Kathabar equipment has paid for itself in the first year.

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(Write here any special humidity problem you may have)

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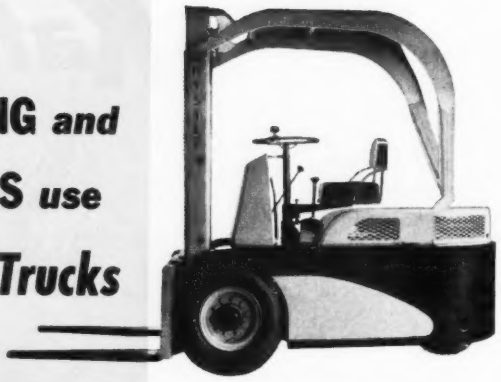

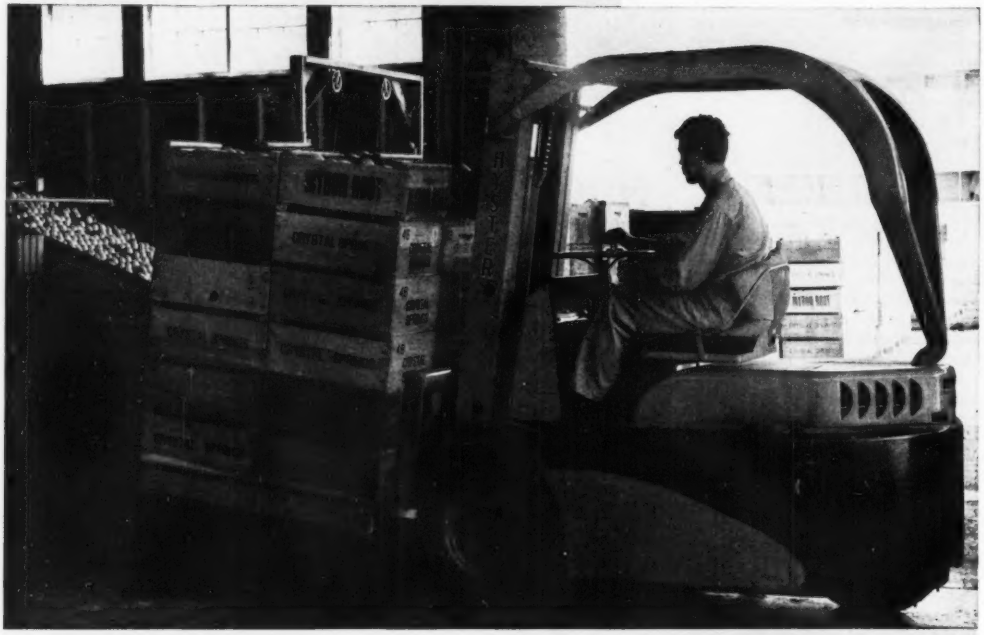

GREAT MANEUVERABILITY. Equally efficient in crowded warehouses and manufacturing areas or in the open spaces of yard storage. Pneumatic tires permit Hyster 40 to work as well indoors as outdoors. 4,000 pound capacity. Several heights of lift available. Free-lift models. Truck width — 43 inches.

EASY TO OPERATE AND SERVICE. Conventional controls. Operator rides easy in a comfortable, adjustable, form-fitting seat. Excellent visibility. Truck is designed to make easy all inspection and service operations.

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have either a high school education, two years' baking experience, or the equivalent.

Offered are two major types of courses—short and general courses. The special short courses cover specific subjects for experienced bakers and men from allied industries. These courses take two to three weeks, and they are given periodically. Short courses are given on cake production, pie making, retail bakeshop practices, and sanitation.

The general course is of 20 weeks' duration, and it covers all phases of bakery production other than those concerned with specialized goods like crackers and pretzels.

10 Weeks on "Why"

Science and baking technology, which represent the "why" of the course, are taken up in the first ten weeks. Emphasis is on subjects relating to baking. Thus, the student gets the necessary background on theory to enable him to understand the second ten weeks' instruction on practical baking.

A student is first taught the elementals of physics and chemistry and then the principles of these subjects—particularly how they relate to bakery ingredients and bake shop practices. He receives a review of arithmetic, also instruction on the use of the slide rule, as a precursor to lessons on bake-shop calculations involving production problems and cost distribution.

Concurrently with classroom work and lectures, there are laboratory studies in science and in experimental baking. These studies give the student the fundamentals for bake-shop practices. Work is designed to give an understanding of the technical control of ingredients, processes, and production.

And 10 on "How"

During the second ten weeks, the student applies theory to actual commercial production. Classified as the practice of baking, this period accents the "how." Under actual shop conditions, and using standard ingredients and equipment, the student alternately works in three shops—cake and sweet goods, bread and rolls, and maintenance. In each bake shop, all steps in the baking processes are followed by hand and by machine.

There are also classes in bakery engineering, which include instruction in the use of mechanical equipment, principles of refrigeration and air conditioning, and maintenance work. The course also includes 50 hr. of actual

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Starting with the basic part of any filter — the filter element — Sparkler design makes every surface easily accessible for thorough cleaning. The few simple parts in the photo represent a complete Sparkler horizontal filter plate, with no cracks, crevices, or hard-to-reach parts that can imperil product purity by retaining objectionable material.

Once the cartridge of plates is removed from the filter, disassembly is quick and easy. Just loosen the tie-rods and the plates come apart in 1 - 2 - 3 order. Lift the paper off, remove the perforated metal wafer, then remove the supporting plates. One man does the entire job in a matter of minutes.

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A NEW VANILLA-LIKE *Flavor* MATERIAL

As a vanilla-like flavoring agent of extremely high potency, VANITROPE has demonstrated an unusual adaptability in all branches of the food, confectionery, baking and ice-cream fields.

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FLAVOR

Used in substantial proportion with other synthetics, VANITROPE brings flavor closer to the true natural vanilla.

STRENGTH

The flavor strength of VANITROPE is sixteen times that of vanillin. In the presence of sugar, this ratio is considerably higher.

CHARACTER

Pure white crystalline synthetic, non-discoloring and non-hygroscopic, with a remarkable stability at high processing temperatures.

COST

The use of VANITROPE permits savings of up to 50% over standard vanilla-like synthetics at equivalent flavor strength.

VANITROPE has proven its value in nationally distributed foods as well as in exhaustive laboratory investigations. VANITROPE, a registered trade name for propenyl guaethol, is of interest to all flavor users. . . . . Inquiries are solicited. Samples and technical bulletins are available for study.

VANITROPE IS A CONTRIBUTION OF } *Shulton* Inc.

FINE CHEMICALS DIVISION

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work on various bakery equipment.

In addition to lectures by school and institute staff, classes are addressed by guest lecturers and authorities in different branches of the baking field. To illustrate subjects, visual aids are employed. These include models, moving pictures, slides, charts, and opaque projections.

Features Flexible Rooms

Space occupied by the school is 16,000 sq. ft., with classrooms and shops on one floor. The four classrooms have insulated folding walls, designed to make one to four rooms. In the student science laboratory are three tables with working-height stools, two moisture ovens, four sinks, a microscope and balance table, and standard equipment such as balances, scales, centrifuges, and microscopes.

In addition, there is the necessary equipment for working out experiments designed to stress the fundamental scientific principles relating to bread and cake baking.

Bake shops have modern equipment for mechanized production. Bread-making units handle 1,500 lb. of dough per hour. Included are automatic flour-handling, blending, and scaling units; a 500-lb. mixer with direct expansion jacket; fermenting room for eight 200-lb. dough troughs; power lift for elevating troughs and dumping dough into 2-pocket divider; rounders; preliminary proofer; molders and panners; 6-rack proof room; traveling-tray oven; bread slicer; and wrapping machine.

An automatic bun machine divides and rounds 250 pieces of dough per minute.

In the cake shop are two reel ovens, wire cookie-cutting machine, automatic doughnut fryer, pie sheeters, two 10-lb. Artofex mixers, and a 48-pan retard box for sweet goods.

Consumer Angles

AIB's consumer service department operates a nationwide program along three lines of activity: (1) Preparation of information on nutritive values of bakery products, (2) operation of a test kitchen for developing recipes and new uses for baked goods, and (3) dissemination of food publicity through various media.

The library contains over 4,000 books related to baking, chemistry, fermentation, nutrition, and other subjects of value to bakers. It has the most complete file of baking periodicals of any library in the country. Clipping files contain over 100,000 items pertaining to baking.

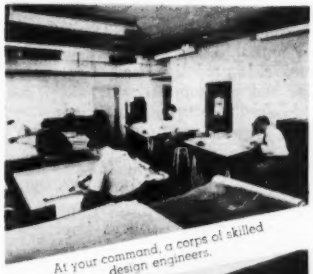
End (Resume reading on page 91)

The entire food industry is faced with labor shortages, scarcities of materials and pegged prices. There is an urgent demand for greater production.

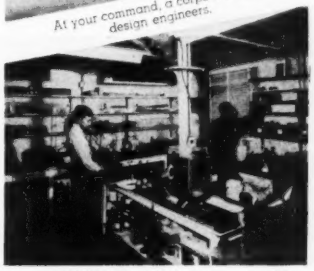
Food processors must have sound engineering and proper machinery to profitably meet the critical situation.

PacRite engineering has pointed the way to higher efficiency and greater profits in food processing plants throughout the world. Our specialized services are at your disposal, either to collaborate with your own engineering department or to handle the entire problem ourselves.

As manufacturers we supply PacRite machinery for most requirements — as engineers we recommend specialized machinery of other manufacturers to do a specific job.



At your command, a corps of skilled design engineers.



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NEW PACKAGES & PRODUCTS

Famous Beer Undergoes Complete Package Redesign

Based on modern merchandising techniques and to meet the growing demand for packages with definite eye appeal, Blatz Brewing Co., Milwaukee, has redesigned all of its packages and promotional material.

All labels, cartons, point-of-sale material, drivers' uniforms—and even beer knobs for draught beer—carry the new triangle theme. The radical change can be seen in the illustration above.

The new design has been developed around a color scheme of gold on the outer edge of a triangle, tan in the middle, and a center of dark brown with the Blatz name in white script.

For greater brand name distinction and increased visibility on the bottles, the triangle appears on the crown, body label, and in two positions on a gold-foil neck label. The gold can features the triangle trademark augmented by a background of "Blatz" in small script on the circumference of the container.

Quart Milk Containers Combined Into Half Gallons

"Twin-Quart" half-gallon containers for milk now are being manufactured by Sealright, Inc., Fulton, N. Y., under its Sealking label.

Housewives purchasing large quantities of milk find this package convenient to handle and more sanitary. And the product has better keeping qualities than milk purchased in conventional half-gallon containers.

By a simple adhesive operation prior to casing, the quarts are combined into the "twin-quart" half gallons. The cartons hold together firmly, yet are easy for the housewife to separate by merely slipping a knife between the containers and pulling them apart. She then has two separate quarts of milk, each with its own seal. This allows her to open a quart at a time, keeping the other sealed and refrigerated until ready for use.

For Package Data Use Reader Service

Fried Bacon Rinds

A new specialty product has been added to the present line of Frito New York, Inc., Mamaroneck, N. Y.

Called "Baken-ets", they are bacon rinds, crisply fried. Their crunchy texture and slightly salty taste make them an excellent compliment to cocktails, soups, and salads. Recommendations on the back of the package also suggest their use for flavoring in egg and casserole dishes.

The product is colorfully packaged in a cellophane bag, printed in three colors—rose-maroon, white, and black. A narrow white strip at the edge of maroon bands sets off the crisp brown of the product. A large white letter "B," with elongated cross bar, bears the words, "Baken-ets Brand" and forms the trademark.

Designer of package is Jim Nash, New York City. Cellophane bags are furnished by The Dobeckmun Co., Cleveland.

For Package Data Use Reader Service

Canned Bamboo Shoots

Canned, diced bamboo shoots now are being marketed by Oriental Foods, Inc., Los Angeles. They are packed in 6-oz. cans under the "Jan-U-Wine" label.

These shoots are an imported Chinese vegetable, used principally in the preparation of Chinese dishes, and are also used in many vegetable dishes.

Which cap sells more mayonnaise?

The colorful cap sells what it seals . . .

creates extra impulse purchases

A bright, eye-catching cap makes your product stand out . . . spotlights your brand name . . . delivers your selling message where it really counts—at the point of purchase.

Easy-to-read price markings are equally important in prompting pickup purchases. Armstrong's expert designers give your cap maximum eye-appeal, at the same time providing ample space for dealers' price marks. Because these caps have a no-wax finish, it's easier to write or stamp prices on them.

Let us show you how an Armstrong-designed cap can improve the appearance of your package. There's no expense or obligation involved. Just call your nearest Armstrong representative or write Armstrong Cork Company, 8508 Prince St., Lancaster, Penna.

Western Representative: I. F. Schnier Co., Inc.
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Packaging Headquarters for Armstrong's Glass Containers, Embossed-Top Corks, Crowns, Artmold Plastic Caps, and Du Pont "Cel-O-Seal" Bands

Complete
PRODUCT MIXING
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LEE DOUBLE-MOTION Center Line Scraper AGITATORS

Standard equipment for over 20 years.

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RAISING AND LOWERING
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Operates directly from your present water system

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FOR EASY CLEANING

Cleaning over kettle means

- No hot messy parts to disassemble
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Our descriptive bulletins on these units will interest you—*WRITE FOR THEM.*

LEE METAL PRODUCTS CO.
416 PINE STREET
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ALL LEE KETTLES ARE MADE TO A.S.M.E. CODE

Redesigned Ice Cream Pack

When an ice cream mix was first launched by Chr. Hansen's Laboratory, Inc., one of the pioneers in the field, the idea of making ice cream in refrigerator freezing trays was new. So the Little Falls, N. Y. company employed a package designed to show the freezing tray and tell briefly how easy it was to make (see package on left).

Now, however, with most consumers completely familiar with the preparation of the mixes, a new package has been designed to present more eye-appeal. Thus, the company's famous "Junket" line is now appearing in new dress, as shown by the group of packages on the right in our photo.

Featured is appetite appeal by the use of full color photos of the ice creams which can be made from the product. The various flavors are indicated at lower right on each package by the initials in the circles: S for strawberry, M for maple, etc.

Package background color is white. On the display face a large circle in deep blue carries the lettering, and the color photo is superimposed on the background.

Back of each package carries instructions and an offer for free recipes.

Design is by Jim Nash, New York City, and package suppliers are the Marathon Corp., Menasha, Wis., and Shellmar Products Corp., Mount Vernon, Ohio.

For Package Data Use Reader Service

Jelly Made Without Heat

Fruit Processors, Inc., Stevensville, Mich., is using a new process for making jellies that retain the elusive natural flavors of the fruits from which they are prepared. These products, states maker, do not have a cooked taste.

The fruit juices are concentrated by a new freeze method rather than by heat.

Sold under the trademark name of Cold-Con, several varieties of the jellies are now on the market. And the concentrated juices are being offered for use by other processors as flavoring ingredients. As yet, however, production is small and distribution limited.

Sugar-Free Ginger Ale

Individuals on a sugar-restricting, weight-control diet can now enjoy a flavored soft drink without fear of counting the calories. For Kirsch Beverages, Inc., Brooklyn, is now marketing a non-fattening ginger ale, called "No-Cal".

The product is made with Sucaryl, an artificial sweetener and an 8-oz. glass of it is stated to contain about

1½ calories as against 100 such units of food energy in a comparable beverage made with natural sugar.

Moreover, market tests and consumer reaction indicate that this ginger ale tastes no different from the conventional type, and as compared with some dietetic products does not have a bitter or metallic aftertaste.

It is presently being bottled in 16-oz,. no deposit bottles. A three-color counter display highlights the non-fattening appeal of this new beverage.

Bottles are furnished by Owens-Illinois Glass Co., Toledo, caps by Consolidated Cork Corp., Brooklyn, and labels by Gamse Lithographing Co., Inc., New York City.

For Package Data Use Reader Service

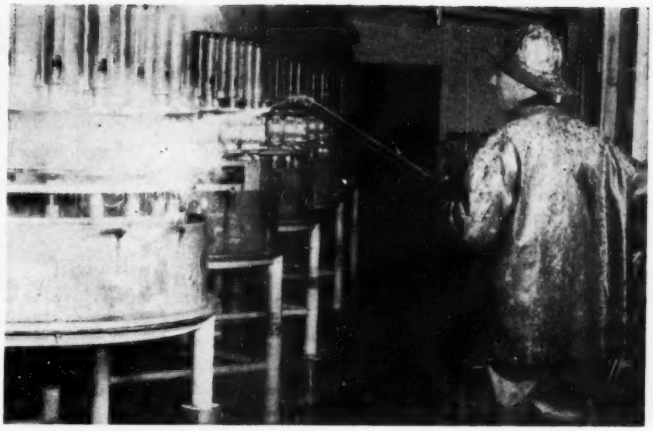
New Liquid Coffee

A liquid coffee concentrate is now being offered by Foster Coffee Corp., San Francisco, under the brand name of "Foster's Q-Brand Coffee".

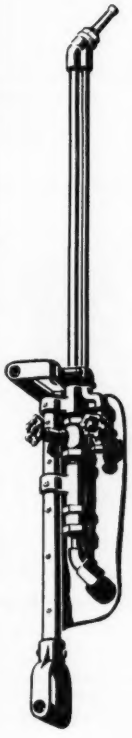
This beverage product, states the maker, is a water extraction of pure coffees with no fillers or flavorings added.

It is packaged in 16-oz. glass bottles with yellow plastic tops which also serve as ½-oz. measuring cups. The labels are designed in yellow, red, and blue. Each bottle will provide 32 cups of coffee.

Since the product must be kept under a constant moderate refrigeration, it is being distributed mainly through dairies and will be sold along with dairy products.



Slash hours off cleaning time with this one-man crew



Here's the 481 Oakite Steam-Detergent Gun—the one-man crew that cleans up your entire plant *in half the usual time.*

No tedious scraping or scouring with this dirt-dynamiter. Just a twist of the valve and the gun fuses heat, force, powerful detergent to get under, lift off all bacteria-breeding deposits—no matter how heavy or how hard-to-reach.

Easy to operate, the Gun requires no motors, injectors, pumps. Just 30 lbs. of steam pressure, a couple of lengths of hose, and a solution container—and you've got the answer to your toughest cleaning problems. The Oakite Steam-Detergent Gun can't be beat for cleaning

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FREE Booklet 7709 tells all about Oakite Steam-Detergent Cleaning—other Oakite shortcuts to plant-wide sanitation. Write Oakite Products, Inc., 26G Rector St., New York 6, N. Y. No obligation, of course.

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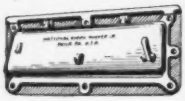
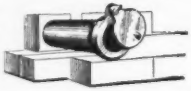


Air Control Door and Frame, top hinged, ratchet type, heavy duty, for manual control. Surfaces are machined to a close fit.

Fuel Oil Suction Strainer, single type. Large basket area insures low pressure drop; cover and basket easily removed for cleaning.

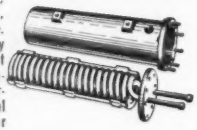
Wide-View Peephole, safety, curtain type. Cobalt glass removed to show bearing surface for curtain. Curtain halves are interlocked—open simultaneously.

Ignition Port with Refractory Tile No. M896 . . . for use with standard 3" pipe. Also serves as a peephole.



Furnace Relief and Access Door, heavy construction, practically air tight. Door casting correctly weighted, lined with plastic refractory retained by imbedded grill; with observation port and cover.

Fuel Oil Heater, Self-Cleaning, Spiral Coil Type. High oil velocity in coil, resultant turbulence prevents carbon formation. No internal connections or joints.



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INDUSTRIAL OIL BURNERS, GAS BURNERS, AND FURNACE EQUIPMENT

Ready-to-Drink Ades Marketed in Handy Pack

Three new items have now been added to the line of refrigerated products offered by Reddi Distributors, Inc., Brooklyn.

The company is now processing, merchandising, and distributing concentrated "Ready to Drink" Sunkist orangeade and lemonade, also Welch's grapeade, in cone-shaped paper Sealright containers. Since they include no preservatives, these fresh fruit products must necessarily be kept under refrigeration.

Selection of the package was given much deliberation, and the final choice of the specific, throw-away cone type was based on its ruggedness and its sanitary features. Moreover, its broad base averts tip-overs.

The company expects that its 35 large, mechanically refrigerated trucks will distribute upward of 10,000,000 units of these drinks in the New York metropolitan area this year.

Containers are furnished by Sealright Co., Inc., Fulton, N. Y.

For Package Data Use Reader Service

Self-Selling Dried Fruit Bag

The Budget Pack, Inc., Los Angeles, is now packaging its extra-fancy dried fruit line—mixed fruit, peaches, apricots, and prunes—in printed Pliofilm bags designed to attract attention of the self-service buyer.

The bag, printed in three colors, carries the product and trade name, together with an illustration of a shining yellow sun to indicate that the products are grown and ripened in sunny California. The back of each bag carries recipes for unusual dishes that can be prepared from the dried fruits.

Furnished by Goodyear Tire & Rubber Co., Inc., Akron, the bags are designed and gravure printed by Shellmar Products Corp., Mount Vernon, Ohio, at its South Gate, Calif., plant.

For Package Data Use Reader Service

Unify Independents' Brand

The W. E. Long Co., Chicago, well-known bakery service organization, now reports success of its move to unify users of the Holsum brand name so that they can compete more effectively on a national scale. After considerable preliminary discussion and research, the company presented a plan which won the support of

Holsum bakers all over the country.

Though Holsum brand bread and baked goods have comprised one of the most widely offered lines of independent bakers in the United States and Canada, there had been no previous effort to band together behind a unified advertising and merchandising program.

Many bakers had developed wrappers of their own, using different identifying logotypes and playing up their individual company names, retarding the effectiveness of the Holsum brand name.

First step in the new plan was to decide on a design which would be agreeable to all. After considering many designers, Egmon Arens, New York City, was selected.

The new Holsum wrapper is a brilliant orange-red, with the Holsum logotype in deep blue on a white rectangular background with rounded corners. This Holsum label appears on the package in two sizes, with lettering large enough for optimum readability. It is repeated on all surfaces of the package, even on the end seals, so that the brand identification is positive, no matter what the position of the loaf.

Stars of four sizes in rich, buttery yellow color, adorn the wrapper. The only wording on the wrapper is the phrase, "Enriched Sliced White Bread". The copyright data, company name of the baker, and weight mark appear in small type in an unobstrusive line near the end of the loaf. Net weight is printed in larger type.

Originally applied only to the regular white loaf, the new wrapper design has now been adapted to many varieties of bread as well as to a large number of specialty items, such as doughnuts, cakes, rolls, Brown 'n Serve, and sweet goods of all kinds.

The wrapper itself offers high protection with its "plastic coated wrapper" in which polyethylene is added to the regular wax application.

The operations of Holsum bakers participating in the plan must measure up to certain standards so that the product itself will come up to the quality proclaimed in the national advertising.

—*End*—

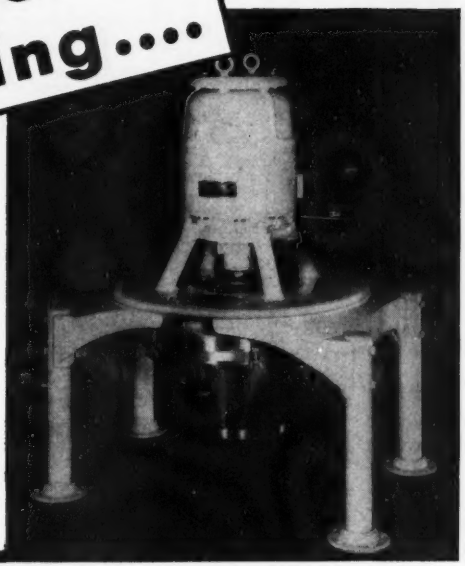
Frozen Pineapple Juice

—*Continued from page 73*

trate plant—a distance of 1,300 ft.—through a 3-in. stainless pipe.

3. Flow Split—Upon arriving, a small portion flows directly into a 4,000-gal. stainless storage tank equipped with agitator—to be used for later blending. But the greatest portion is sent

Improved Mixing....



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The "ENTOLETER" Mixer requires only 12 cu. ft., with capacity of 12,000 lbs. of finished mix per hour. . . . where beetle or similar insect infestation may be present, this equipment destroys all stages of insect life. Mail coupon today.

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Please send bulletin describing the "ENTOLETER" High-Speed Mixer

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Foreign Distributors: Henry Simon Ltd., Stockport, England

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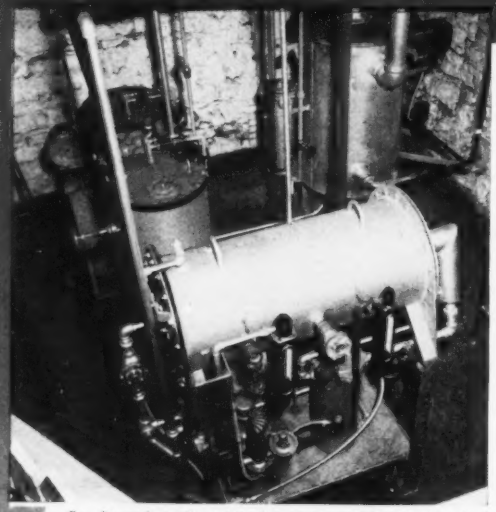


Gas Atmospheres Inert Gas System at work in a leading food plant. Note compactness of this high production system that includes generator, dryer and trace oxygen removing equipment.

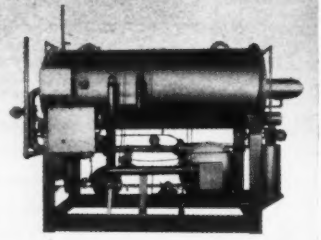
Machine also lowers cost of line purging and blanketing . . .

Eliminating headspace oxygen from canned goods can now be performed easier and at less cost than ever before. Gas Atmospheres Inert Gas Generators, thoroughly tested by leading packers, produce products at less cost, and of better color and flavor by eliminating headspace oxygen to less than 1%.

Gas Atmospheres Inert Gas Systems work in less floor space and at less cost than any other method.

For chemical use, too, Gas Atmospheres Inert Gas equipment cuts costs of purging, blanketing, etc., to new lows.

Get all the facts before you buy. Find out about the amazingly compact, explosion-proof, low cost Gas Atmospheres Inert Gas Systems today. Write for Bulletin I-552.



For more complete information write for Bulletin number I-552

gas Atmospheres, inc

equipment for producing industrial gases

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through the Carrier-Howard high vacuum low temperature, triple-effect evaporator. Here, this juice is partially concentrated and the volatile esters separated.

4. Volatile Agents—These aromatic, flavor-bearing volatiles are collected in the second and third effect condensates, which are then fed to a special vacuum fractionating column.

This column is equipped with a refrigerated condenser for the recovery of esters while the condensates are undergoing rectification at reduced pressures.

Since the unit concentrates the natural alcoholic content to above ½ percent (it sometimes gets as high as 2 percent), the plant comes under regulation of the Bureau of Internal Revenue. This office normally requires facilities of this type to be kept indoors, but special permission was granted to Dole for the dollar-saving outdoor construction used.

The concentrated esters are stored in a 1,000-gal. stainless cold-wall tank at a temperature of 35 deg. F.

5. Partial Concentrate—36,000 gal. of this partly processed juice are put up in these 6 hr. and stored in three 12,000-gal., cold-wall stainless storage tanks equipped with motor driven agitators. Here, it's maintained at 40 deg. F.

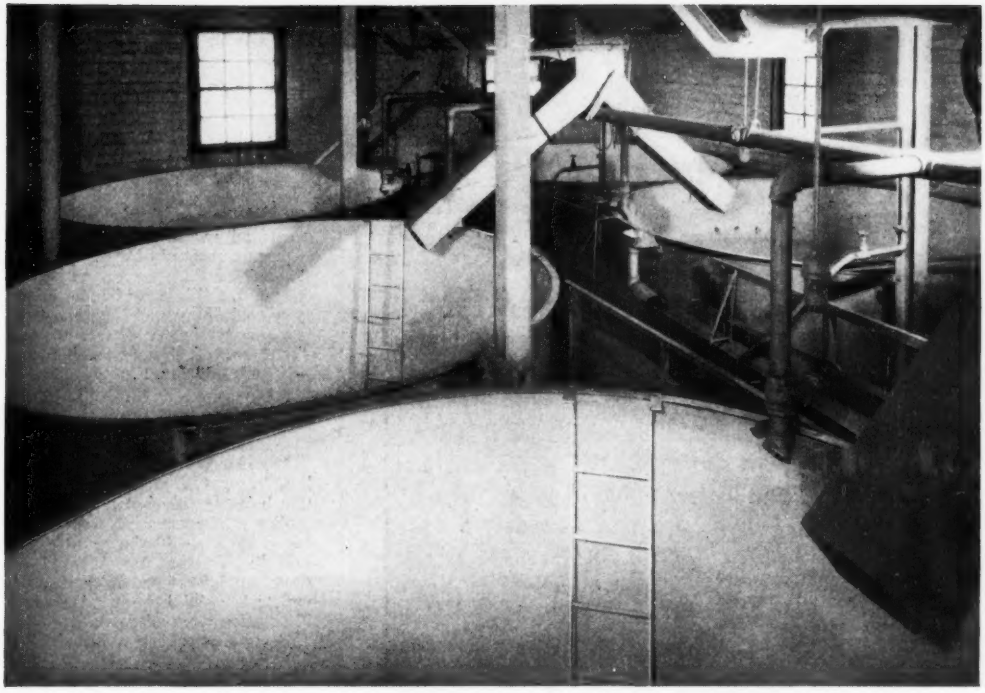
After this initial 6-hr. period of receiving fresh juice and preparing the partial concentrate, the process enters the final stages. Juice is pumped from the storage tanks back into the triple effect evaporator, but at a slower rate than before. This time it is concentrated to 66 deg. Brix.

Vacuum in the concentrators is provided by steam jets and a salt water barometric condenser. In the first effect it averages 50 mm. Hg absolute pressure, 35 in the second, and 25 in the last.

6. Blending—This step is accomplished in three 1,000-gal. stainless, cold-wall tanks. Set quantities of (a) single-strength cutback juice and (b) volatile flavor concentrate are added to the 66-Brix juice concentrate to produce a final product with a density of 47 Brix. Density control and proportioning are done automatically with a Carrier-Howard blender.

In this manner a standard quality product is packed that does not vary year-'round, as does the unsweetened canned single-strength juice (which tends to be tart in the winter and sweet in the summer).

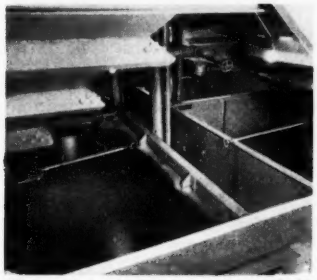
7. Canning and Freezing—Product is filled into the familiar 6-oz. can using a Pfaudler RF-14 pocket filler. From here, the cans go to the floor above for quick freezing in the air-blast tunnel. The latter is 86-ft. long, 16-



No Corrosion...No Wear in FIVE YEARS

MOLD AND FUNGUS are the arch-enemies of paint films and tank linings throughout the food industry. In the malting industry, millions of bushels of grain and mineral waters cause additional abrasion and corrosion. Ordinary paint films last only three or four months.

In 1947, the grain steep tanks shown above were coated with materials formulated with VINYLITE Brand Resins. *Not a cent* has been spent on maintenance, and there's *still* no evidence of paint deterioration!



These tanks were saved from the scrap pile in 1944. Their Bisonite Coating, formulated from VINYLITE Brand Resins, stopped deterioration completely and have remained intact for years.

Five tough years compared with four months—proof of the ability of coatings based on VINYLITE Brand Resins to do a superior job under tough conditions.

Similar paints based on VINYLITE Resins can give such protection to your plant or product. *Properly formulated, properly applied* by dip, brush or spray, they resist most chemicals, corrosive atmospheres, oil and water. Likewise, they protect contents from container contamination, for they dry quickly to an odorless, tasteless, non-toxic finish.

Applied to metal, concrete, or masonry, they strongly resist abrasion, impact and thermal shock, are non-flammable, and may be scrubbed repeatedly without losing color or texture. Their wide range of colors includes flat, semi-luster and glossy finishes. Paints formulated from VINYLITE Brand Resins have the unique qualities that make these resins so useful for scores of products in defense and basic industry.

Let us send you more information about these coatings and data on sources of supply. Write Dept. MH-74.

The coatings used on the tanks shown here were manufactured by the Bisonite Company, Inc., 128 Lakeview Ave., Buffalo 1, New York.

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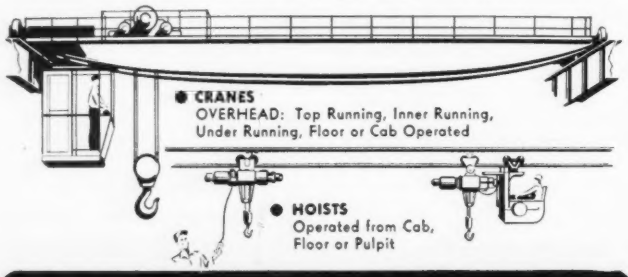
Specialists in loads through-the-air since 1903.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● HOISTS
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CRANE AND HOIST CORPORATION

1213 SCHUYLER AVENUE • MONTOUR FALLS, N. Y.

ft. wide, and incorporates a 10-ft. wide variable speed, wire mesh conveyor.

The tunnel operates at −40 deg. F. Twelve Carrier brine-spray cold diffusers, Type 15T9-289, provide the necessary cooling. All twelve are required for the pineapple chunk freezing, but only six for the concentrate.

From the tunnel, the product is cased and moved to the new cold storage warehouse by lift trucks. This storage facility has a volume of 230,000 cu. ft. and is served by four brine-spray cold diffusers of the same type as employed in the freezer tunnel. Temperature is maintained between −10 and −20 deg. F.

Islands' Largest

The new refrigeration plant is the largest of its type in Hawaii—over 350 tons being furnished at four levels of cooling. These are: 96 tons of refrigeration at −40 deg. F. (freezer tunnel); 30 tons at −10 deg. F. (warehouse); 94 tons at 5 deg. F. (cold wall tanks); and 137 tons at 40 deg. F. (fractionator condenser).

Compressor equipment includes the following:

Warehouse — Two-stage system, first stage consisting of a Fuller A-50 compressor driven with a 25-hp. motor and a second stage Carrier 5J41 unit with a 100-hp. motor. A Carrier 909 evaporative condenser rounds out this set-up.

Freezing tunnel—Two first stage Fuller A-120 rotary compressors, each with 100-hp. motors. Second stage is in common with other section below.

Cold wall tanks—These plus the freezing tunnel second stage are serviced by three Carrier 5J61 compressors with 150 hp. motors.

Vapor condenser—This is handled by a single Carrier 5J41 compressor with a 125 hp. motor. (Refrigerant evaporates on the tube side of a shell-and-tube heat exchanger, while water vapor is condensed on the shell side.)

Basic engineering and design were by E. J. Kelly, of Carrier, and Dole personnel, particularly Dr. George Felton, food chemist. Fabrication of the evaporators, fractionator system, cold-wall tanks, and other system components, was by the C. E. Howard Corp. of South Gate, Calif.

Hawaiian Pineapple personnel did much of the construction work themselves, but the larger stainless units had to be put together in California and shipped over 2,400 miles of ocean due to the lack of facilities for assembling this type equipment in Hawaii. *End* (Resume reading on page 74)

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(Advertisement)

INSIDE SCIENCE

The Vital Story of Bread Enrichment

by Science Writer

1951 marked the Tenth Anniversary of the white bread and flour enrichment program in the United States. This ten-year experience proved the success of a program which used the combined talents of bakers and millers, nutritionists and physicians, diet experts and chemists . . . an inspiring example of how a good food is made better in the American way of free initiative and cooperating effort. In fact, the value of enrichment is so highly regarded that over one half of our states and several territories have already passed laws making its use mandatory in all white bread and family white flour sold commercially in those areas. The Council on Foods and Nutrition of the American Medical Association is on record as supporting enrichment as is the Food and Nutrition Board of the National Research Council.

> "It is encouraging and gratifying to compare the health of the American people today with what it was 10 years ago," said Elmer L. Henderson, M.D., President of the American Medical Association.
>
> "And I do not think it is too much to say that a very important part of the more buoyant health and the increased mental and physical vigor the American people enjoy today can be directly credited to the enrichment of bread with essential vitamins and minerals."

The skeptics, "food faddists," and others who demanded proof that enrichment benefited the public health were again answered emphatically when the dramatic results of a long term nutritional study in Newfoundland were made public.

What is enrichment? Before answering that question, let's note two indisputable facts.

Fact No. 1—Americans generally want beautifully fine, white bread.

Fact No. 2—In milling and processing wheat to get this white flour which the public demands, some nutritional values are unavoidably lost.

Enrichment is the process which restores the following vital vitamin and mineral values to the finished white bread or milled white flour: thiamine, riboflavin, niacin, and iron. Calcium and vitamin D may also be added as optional ingredients.

Many vitamins have been isolated in the laboratory so that the pure substance could be studied. Brilliant chemists have "built" duplicates of them by complex processes. They are identical chemically and biologically with those existing naturally. A vitamin is a vitamin regardless of its source, just as salt is salt whether it comes from a mine or is evaporated from the sea. Large-scale manufacturing efficiency permits vitamins to be sold at a lower cost than if they were extracted from natural sources.

These are the vitamin and mineral factors which are used in white bread and flour enrichment:

Thiamine—also called vitamin B_1. This vitamin helps to build physical and mental health. It is essential for normal appetite, intestinal activity and sound nerves.

Riboflavin—also called vitamin B_2. This vitamin helps to keep body tissues healthy and to maintain proper function of the eyes. It is essential for growth.

Niacin—another "B" vitamin, is needed for healthy body tissues. Its use in the American diet has done much to make a serious disease called pellagra disappear.

Iron—is the mineral used in enrichment. It is essential for making good, red blood and preventing nutritional anemia.

It is possible to enrich bread by two basic methods. One involves the use of flour which is enriched at the mill in accordance with the Federal Definitions and Standards of Identity. The other method, which is widely used by bakers, merely requires the addition of a small wafer.

The Hoffmann-La Roche people manufacture vitamins literally by the tons. To do this they must use amazingly complex processes with scientific production controls and the latest equipment, which can fill a building a city block square and many stories high. Roche combines the enriching ingredients in a form known as the Square wafer. It is distributed by leading yeast company salesmen throughout the United States.

The Square wafer for bread enrichment measures 1¼ inches across. It is ¼ of an inch thick. Yet it contains enough thiamine, riboflavin, niacin and iron to enrich 100 pounds of flour so that the resulting product will meet the requirements of all State enrichment laws with an ample safety margin. The formula is as recommended by the Scientific Advisory Committee of the American Institute of Baking.

You can expect these advantages when you use Square wafers.

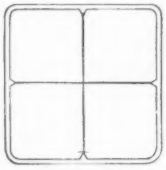
Assured potency—when Square wafers are used as directed you can be sure that your finished bread will be enriched.

Quick disintegration—Complete disintegration with stop-watch speed when dropped into the agitated water in your yeast emulsifier.

Super-thorough diffusion—Flour-fine particles insure that the enriching ingredients are distributed evenly throughout each loaf.

Finer, more buoyant particles—Square wafers break down into thousands of particles which are flour-fine and more buoyant so that they stay in suspension longer; you have less pail rinsing.

Clean, even break into halves and quarters—Square wafers are sturdy; they resist chipping, cracking and dusting during handling and shipping. They are scored so that they break cleanly into halves and quarters which is important when you enrich small or odd-sized doughs.



Square wafers are available in two types, each in boxes of 50, cartons of 1000.

Type A—for use in bread formulas requiring 3% or more of non-fat milk solids.

Type B—for use in bread formulas requiring less than 3% non-fat milk solids.

Here is a suggested statement for your labels or wrappers which has the approval of the A. B. A. and the A. I. B.:

> 8 ounces of this enriched bread supplies you with at least the following amounts of your minimum daily requirements for these essential food substances: Thiamine (Vitamin B_1) 55%; Riboflavin (Vitamin B_2) 17.5%; Niacin (another "B" Vitamin) 5 milligrams; Iron 40%.

This information has been published as a service to the baking industry by the Vitamin Division, Hoffmann-La Roche Inc., Nutley 10, New Jersey.

ADVANCES IN TECHNOLOGY

Ice Cream Frozen Continuously by New Process Employing Refrigerant-Mix Emulsification

Application of an entirely new principle to continuous freezing of ice cream mix, and apparatus for carrying out the process are features of a recently granted patent.

In the process, ice cream mix and liquid refrigerant (CO_2 or a similar non-toxic liquid) are emulsified under pressure. Then the emulsion is exhausted into a separating chamber (at approximately atmospheric pressure) where a part of the refrigerant evaporates to effect instantaneous and complete freezing of the mix particles.

Remaining, absorbed refrigerant expands to provide over-run in the ice cream, which is then extruded to be filled into desired containers. The extruding mechanism compresses the ice cream to desired weight. Refrigerant evaporated in separating chamber is recovered, liquified and reused.

To insure uniform feed of mix and liquid refrigerant to mixing chamber, pumps supplying these products are operated by the same motor. Also, extruding-worm motor is wired with pump motor for controlled operation.

Digest from U. S. Patent 2,594,442, issued April 29, 1952 on an application dated June 16, 1947, to E. M. Irwin, San Marino, Calif., assigned to Basic Processes, Inc., Pasadena.

Improved Sterile Milk

A process for treating whole sweet milk to produce a sterile canned product without the usual condensed milk taste is the object of a recent patent.

Following the usual filtering or clarifying, 0.1-0.2 percent edible grade hydrogen peroxide is added to the milk at the preferred temperature of 120 F. The milk is held at this temperature for approximately 30 min., then excess H_2O_2 is dissipated by addition of 0.1-0.2g. powdered catalase enzyme per 1,000 lb. milk. This is followed by homogenization, and canning in the usual manner, sterilizing at approximately 233 F., and cooling.

Since the H_2O_2 treatment destroys heat-resistant, spore forming, anaerobic bacteria found in milk, a much lower temperature and shorter exposure is necessary to provide a sterile product. This is said to give a product without cooked and scorched flavor.

Digest from U. S. Patent 2,596,753, issued May 13, 1952, on an application dated Sept. 14, 1951 to Lloyd T. Winger, Trinidad, Colo.

Sucrose and Ascorbic Acid Prolong Frozen Milks' Life

Addition of sucrose plus ascorbic acid have been found to improve the keeping qualities of frozen homogenized milk.

In concentrations of 0.5, 1.0, 1.5, and 2.0 parts per 100 parts of milk, sucrose retarded a noticeable separation in the thawed milk for 185 days. Samples with 0.5, 1.0, and 1.5 parts of sucrose were definitely oxidized when thawed after 91 days of storage. Samples with 2.0 parts sucrose were oxidized when thawed after 100 days of storage.

Control samples showed noticeable separation when thawed after 100 days, and were definitely oxidized when thawed after 75 days of storage. All samples were stored at −10 F. A second series stored at 0 F. did not keep so well.

Samples treated with sucrose plus 10 mg. ascorbic acid showed noticeable separation when thawed after 129 days of storage, but were free from oxidized flavors when thawed after 212 days of storage.

Digest from "Frozen Homogenized Milk. VIII. Effect of the Addition of Sucrose and Ascorbic Acid on the Keeping Quality of Frozen Homogenized Milk," by R. H. Yager and E. S. Windham, *Journal of Dairy Science*, 195-98, March 1952.

MEATS AND FISH

Sugar Ups Dressed Weight Of Slaughtered Livestock

Feeding sucrose to beef and swine for short periods before slaughter increases dressing percentages, and improves the color, increases the sugar content, and lowers the pH of fresh cuts. Also, the livers are larger, contain more sugar, and have better flavor and texture when cooked than those of animals not fed the sugar.

These were findings of studies conducted at the Utah Agr. Expt. Station where 60 beef cattle and 12 swine were fed sucrose, varying from 0-25 percent of the ration, for 3-14 days prior to slaughter. With the beef cattle, dressing percentages increased 0.7 percent by feeding 2 lb. sugar daily for 3 days, and 1.7 percent with 4 lb. Liver weights increased 12-14 percent.

In the case of swine, sugar feeding increased dressed percentages 4.6 percent, and weights of livers and hearts. The sugar-fed livers were preferred by panel judges because of their improved texture and flavor.

Digest from "Meat Quality and Dressed Percentage Increased by Feeding Sugar to Livestock Prior to Slaughter," by E. B. Wilcox, D. A. Greenwood, L. S. Galloway, M. B. Merkley, W. Binns, J. A. Bennett, and L. E. Harris, Farm & Home Science (Utah Agricultural Expt. Sta., Logan, Utah), 32, 33, 47, June, 1952.

Fish Round-Frozen At Sea Give High Quality Fillets

Preliminary experiments having demonstrated the feasibility of quick-freezing fish at sea, the Fish & Wildlife Service has equipped an experimental trawler for this purpose. The boat is being operated in the standard manner of a New England trawler to gain experience for commercial fishing.

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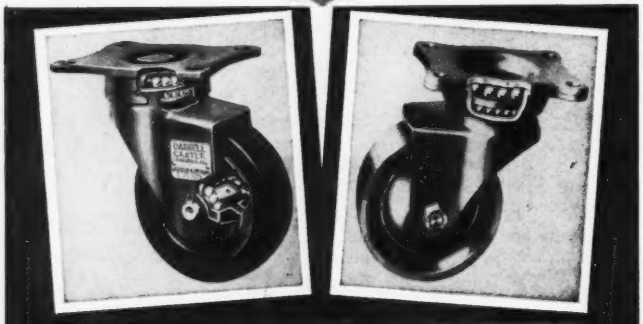

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The complete process involves quick-freezing aboard, with later defrosting, processing, and refreezing ashore. Results of this procedure were compared with those obtained with fish dressed and iced aboard the trawler.

Fillet yield from round-frozen fish was higher than from commercially-iced fish. Trimethylamine content, determined at monthly intervals for 7 months, was found to be 2-5 times higher in experimentally-iced fillets than in those from the round-frozen fish. Free drip was higher from ice-dressed than from round-frozen fish; and organoleptic tests found the latter superior to the ice-dressed fish.

Preferred freezing method is by immersion in a circulating brine solution at 5 F. Thawing is by immersion in circulating water at 65 F. Salt penetration due to freezing in brine is not serious, and much of the excess is removed by thawing in water. No new problems were posed in the filleting, packaging, and freezing of fillets from round brine-frozen water-thawed fish. In scaling there is an advantage in favor of the round-frozen fish. On the whole, experimental results are favorable to the idea of freezing fish at sea as a means of preserving freshness of the product.

Digest from "Freezing Fish at Sea—New England, I—Preliminary Experiments," by J. C. Hartshorne and J. F. Puncochar; "II—Experimental Procedures and Equipment," by H. W. Magnusson, S. R. Pottinger and J. C. Hartshorne; "III—The Experimental Trawler *Delaware* and Shore Facilities," by C. Butler, J. F. Puncochar and B. O. Knake; "IV—Commercial Processing of Brine-Frozen Fish," by C. Butler and H. W. Magnusson, *Commercial Fisheries Review*, Vol. 14, 1-30, Feb. 1952.

CANNING

Problems In Sterilization

The F (or F_o) values of a processing method (equivalent minutes at 250 F.) and hence the sterilizing effect can be affected by lags in temperature come-up time in the retort if it is inadequately vented to eliminate air.

The lag is measured in degree-minutes, and the effect on the sterilizing value can be considerable. Thus, at a processing temperature of 240 F., a temperature spread of 45 deg.-min. would reduce the F_o value in a convection heating product by more than 0.8, or a loss of over 20 percent in sterilizing value for a product such as green beans or asparagus.

Maintaining the pressure in a retort during the cooling cycle also keeps the sterilizing value at a high level, since boiling of the can's contents, with resulting turbulence and more rapid cooling, is prevented.

Data on commercial cooling methods in canals (short wide and long

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narrow), continuous pressure and atmospheric coolers, and a spinner cooler, indicate a water usage of 7.5-9 gal. per case for canal-cooling of peas, and 13.4-17 gal. per case for cream style corn, appreciably less than for spray cooling or retort cooling.

Digest from "Processing and Cooling of Canned Foods, Some Heat Transfer Problems," by V. H. Hemler, D. V. Alstrand, O. F. Eckelund, and H. A. Benjamin, *Industrial and Engineering Chemistry*, 1459-65, June 1952.

FERMENTATION

Malo-Lactic Fermentation

Conversion of malic acid to lactic acid by certain lactic bacteria, can be useful in modifying the sharpness of fermenting ciders, but in sub-acid juices, or in dry ciders it may not be desirable.

Since the malic converts to lactic acid with a loss of CO_2 (decarboxylation) that changes a dibasic to a monobasic acid, the titratable acidity of a cider can be sharply reduced by the malo-lactic fermentation.

Malic acid can be determined easily by addition of 50 percent acetone and precipitation with lead acetate. As long as the sole acidity change is the conversion of malic to lactic acid, the ratio of calculated acidity to observed free acidity should remain constant at its original value. The ratio is called malo-lactic index, and by following it, development of undesirable acidity by other fermentations, acetic for example, can be detected. A fall in the index indicates development of acidity by other fermentation reactions, even in sharply acid juices in which the free acid is decreasing.

Digest from "Some Observations on the Malo Lactic Fermentation of Cider," by C. R. Marshall, *Journal of the Science of Food and Agriculture*, 91-96, Feb. 1952.

High Solids Dilution Waters Inhibit Vinegar Bacteria

Tests of vinegar production in Frings-type laboratory generators of about 1.5 gal. capacity, using waters from Md., Northern Calif., N. C., Northern Tex., Central Kans., and Southeastern Wis., showed that behavior was quite different when the different waters were used for diluting the specially denatured alcohol (35A) fed to the generators.

Efficiency of the generators dropped for about 6 months then began to improve. One water from Northern Calif., however, led to continually decreasing efficiency over a 9-month period. Composition of the water appears to affect the action of the vine-

(*Turn to page 181*)

Celanese Corporation of America Sells as it Ships

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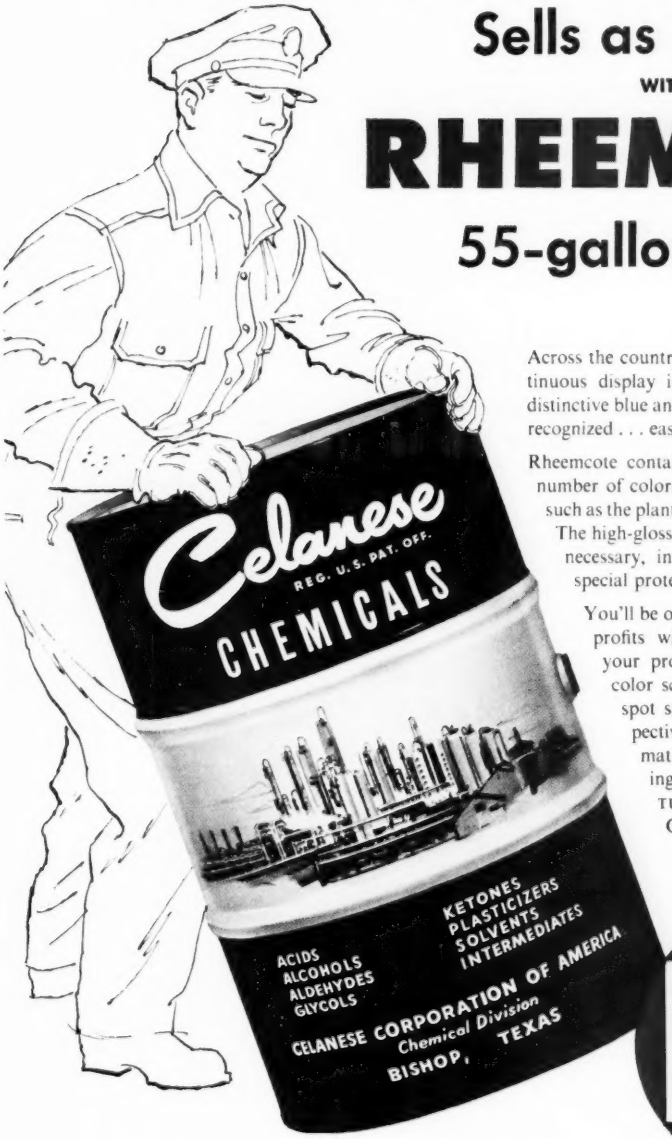
55-gallon drums



Across the country, Celanese* products are on continuous display in Rheemcote poster drums. The distinctive blue and white Celanese design is instantly recognized . . . easily remembered.

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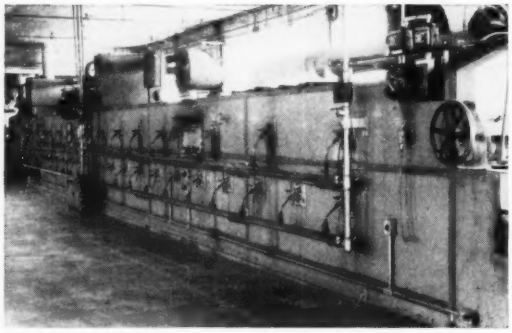
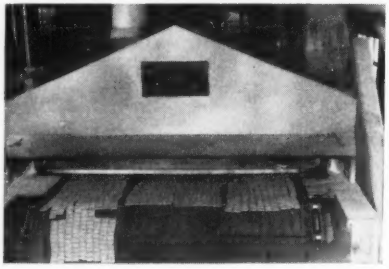
Baking **Ken-L BISKIT** *at Quaker Oats Company emphasizes scope of* **GAS** *usage in food processing*



One of the 65′ Gas-fired travelling ovens in which Ken-L-Biskit is baked under full automatic control.



Crisp, golden brown squares of Ken-L-Biskit come out of the Gas Oven.

Dog food, prepared by Quaker Oats Company, is processed in the same scientific manner, and under the same sanitary conditions as if it were for human consumption.

And, as in commercial baking operations everywhere, GAS is used as fuel for the continuous travelling ovens in which Ken-L-Biskit is processed according to formulae developed by animal nutrition specialists.

Two-Gas-fired ovens, each 65-feet long by 7-feet wide, operate on a 24-hour schedule six days a week. Automatic GAS controls maintain the precise temperature required for processing during the entire cycle.

Although the packaged Ken-L-Biskit is marketed in several grades of granulation, the perfectly baked pet food comes from the ovens in biscuit shape, uniformly baked and golden brown in color.

That's a typical result of baking, roasting or toasting with GAS—the ideal fuel for processing of food in any form. It's the kind of heat processing you can expect because GAS has been successfully applied to virtually every food industry cooking need and experienced Gas Company Representatives can help you use it economically and automatically.

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gar bacteria in a way that is not entirely clear. In most cases they adapt themselves and then return to normal activity. Substitution of the control water supply accelerated the recovery in most cases. City water supplies give better results than natural well waters, and the better waters for vinegar making are those of low solids, hardness and chloride content.

Digest from "Operation of Pilot Plant Vinegar Generators. Effect of Various Types of Dilution Water," by R. J. Allgaier, R. T. Wisthoff, and F. M. Hildebrandt, *Industrial and Engineering Chemistry*, 669-72, March, 1952.

ENGINEERING

Vacuum-Gassing Apparatus

Novel apparatus has been invented and patented for vacuumizing, gassing, and closing containers, particularly those packed with coffee or comparable powdery substances.

In operation, containers and covers are fed into the vacuumizing and gassing machine, each container and cover being sealed within a treating bell. With the cover held above the open top of the container, a low vacuum is gradually drawn in a manner to insure against bits of coffee being deposited where they will hinder the subsequent double-seam sealing of the container.

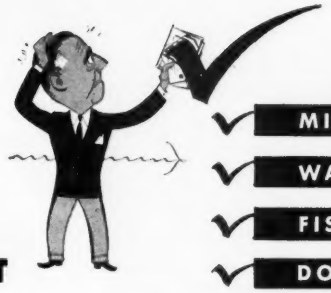
The bell then passes into communication with a duct through which a high vacuum in the container is effected without disturbing the contents thereof. By vacuumizing in two stages, it is possible to create a vacuum in excess of 29 in. Then the unit port of the bell passes into communication with a gas duct, and the gassing is effected at 2-lb. pressure. After vacuumizing and gassing, the cover is released and forced into tight friction assembly in the container. The latter is then transferred to the closing machine where the double-seam sealing is accomplished.

Digest from U. S. Patent 2,578,815, issued Dec. 18, 1951, on an application dated Dec. 20, 1946, to A. L. Kronquest, Syracuse, N. Y., assigned to Continental Can Co., Inc., New York.

Removes Eggs From Shells

An improved machine for automatically piercing and removing contents from egg shells is the object of a recent patent.

The device comprises an endless conveyor belt fitted with receptacles in which eggs are continuously carried through the process. Successively, the egg is cracked from below by a hinged mallet, pierced by a vertical plunger (forced upward through both bottom



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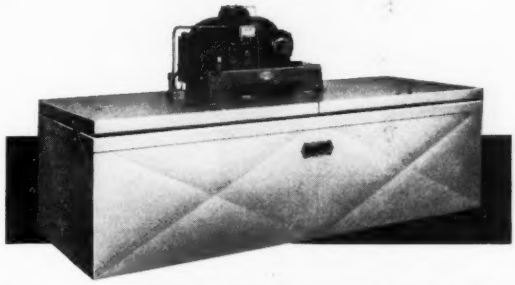
Liquids may be chilled by passing through cabinet—or by secondary circulation of chilled water piped from the unit. Unit stores up ice deposits for use during peak load periods—requires minimum connected horsepower. Models from ¼ HP to 7½ HP factory assembled—larger models, sized to your needs. Larger models come in two sections, (1) chiller unit, (2) refrigeration unit. These are matched units, easily connected on location. Ask your Brunner dealer—or mail coupon.



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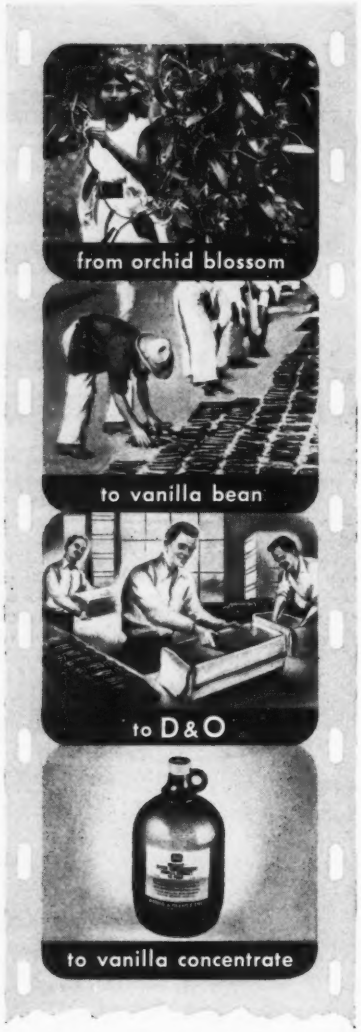

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and top of the egg), subjected to compressed air from above that forces the contents out of the shell and into a collecting receptacle. The belt may carry a plurality of lines of eggs which are simultaneously cracked, pierced, and blown as described.

Machine embodies an improvement over previous devices in that the cracking and piercing are done from below and the contents are blown downward out of the shell, thereby avoiding drip of the contents over the shell.

Digest from U. S. Patent 2,594,619, issued April 29, 1952, on an application dated Oct. 14, 1949, to A. Bosch and G. J. Noltes, Amsterdam, Netherlands.

FATS & OILS

Modifications In Processing No Aid to Soybean Oil

Development of off-flavors in soybean oil cannot be effectively retarded or prevented by present processing methods.

This is the conclusion reached as a result of chemical and physical measurements, and taste panel tests on laboratory refined American and Canadian solvent extracted soybean oils.

Procedures included: Deodorization for 1-hr. at 240 C., and for 4-hr.; deodorization in presence of citric acid; treatment with 0.5 percent activated magnesia, and with conc. HCl; and refining in miscella with and without addition of BHA.

Subjective appraisals of intensity of undesirable odor in the oils themselves, and of odor and flavor of doughnuts fried in them, were made by a 24-member panel. They concluded that all heated oils had a slight to moderate intensity of undesirable flavor; that oils refined in miscella had more objectionable odors than those refined by standard methods; that there were no significant differences in flavor of doughnuts fried in any of the test oils, and that addition of BHA had no noticeable effect on odor or flavor scores.

Digest from "Processing Procedures and Flavor Stability in Soybean Oil," by H. J. Lips, N. H. Grace and J. A. Ziegler, *Canadian Journal of Technology*, 1-8, Jan. 1952.

FRUITS & VEGETABLES

Preserving Potatoes

Frozen mashed potatoes that will keep for months without change in condition, and can be made ready to serve with a minimum of preparation are objects of a recently patented continuous process.

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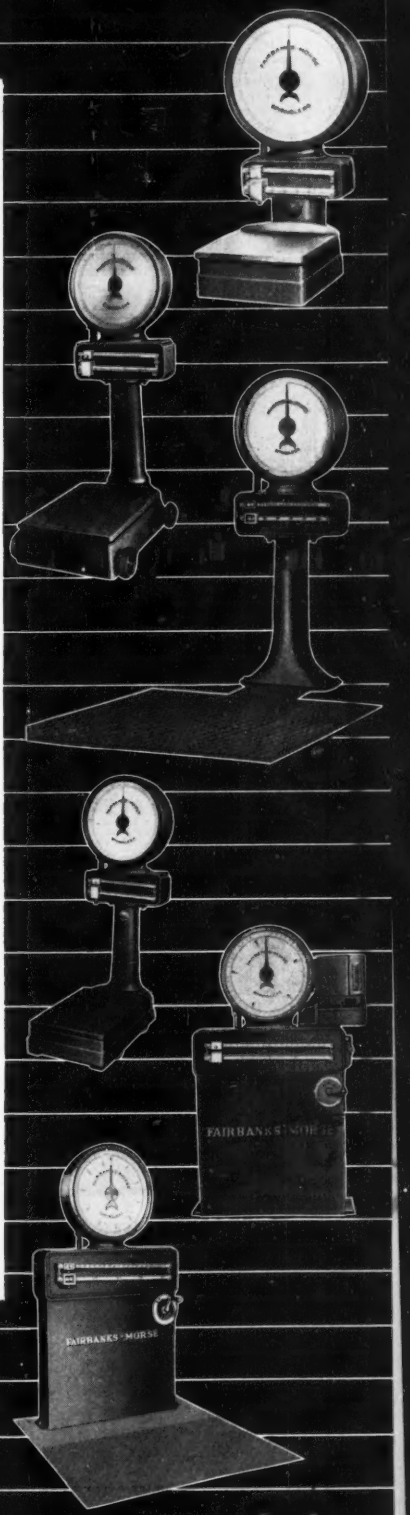

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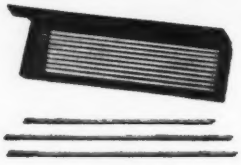
Laboratory

ALL-METAL

—have readable, dial-type scales and corrosion-resisting stainless steel stems—stem lengths from 2" to 24"—ranges from low as −100°F. to high as 1000°F.—accuracy ½ of 1% of thermometer range.



GLASS

—certified sets of ASTM Testing thermometers with overlapping ranges in protective case. Ranges from −36°F. to high as 760°F. Also precision and standard etched stem thermometers for general testing.

Industrial

ALL-METAL

—provide unmatched readability and durability—accuracy within 1% of thermometer range. Available in all types, ranges and stem lengths (2½" to 72") for all requirements.

GLASS (Metal Case)

—available in all forms, all ranges, stem lengths and connections. Accuracy within one scale division. Also submarine types, metal and cupcase thermometers.

Remote Reading

ELECTRICAL

—resistor bulb sensing element permits mounting indicator any distance away from point of measurement. *Multiple* remote readings also possible by use of selector switch and several bulbs.

PRESSURE ACTUATED

—for remote reading, in 5, 6 and 8" dial sizes. Ranges from low as −325°F. to high as 1000°F. Accuracy one scale division unaffected by vibration or severe shock. Cases of iron, brass, or plastic.

WESTON Temperature Instruments

9413

—TO INDICATE—RECORD—CONTROL

In the process potatoes, conditioned to reduce sugar content to less than 1 percent, are washed by revolving fiber brushes while subject to a high pressure spray of cold water, then sorted to remove waste, and steamed for ½-¾ min. with 100 psi. steam.

Potatoes then enter a washer-peeler where a heavy ice-water spray loosens the thin outer skins and revolving brushes remove them. After manual removal of eyes and specks, potatoes are mechanically cut into ⅜ in. square strips which fall into a tank of vigorously agitated fresh water. After 3-4 min. strips are conveyed to sizing screens which separate the off size pieces. Strips are then blanched by live steam at 250-300 F. for at least 3 min. then go to an air cooler-dryer where moisture content is reduced to 65-68 percent. This is followed by beating to a white fluffy mass, extruding into ½ in. thick sheets which are cut into cubes, frozen continuously at about −25 F., packaged and stored.

Digest from U. S. Patent 2,597,067, issued May 20, 1952, on an application dated Sept. 13, 1949, to H. M. Chase, Nampa, Idaho, assigned to A. M. Chase.

Processing Tomato Juice With Sound Waves

Treating tomato juice to produce purees and like products without application of heat is the object of a recent patent.

In the process, tomato juice is subjected to supersonic sound waves having frequencies of 280-300 kilocycles and of sufficient power to penetrate the entire mass (approximately 1 kw. per in. penetration). A gelatinized product is said to result from rupture of cell structures having the same consistency as heat-processed puree.

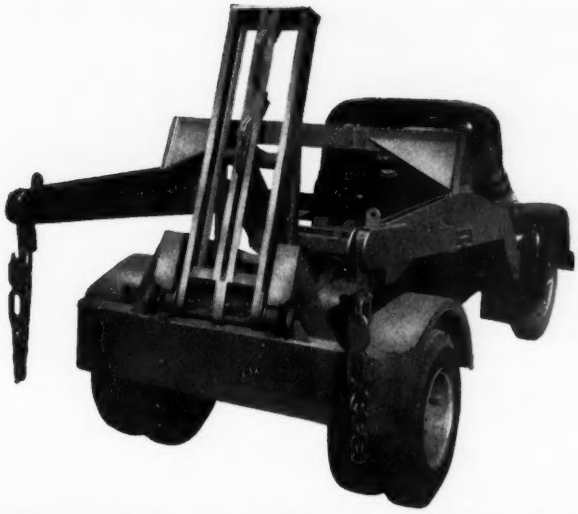
Digest from U. S. Patent 2,598,374, issued May 27, 1952, on an application dated April 21, 1950 to R. A. Havens, B. E. Orr, P. R. Pitts, Jr., and R. W. Cunningham, assigned to R. A. Havens, Indianapolis, Ind.

BAKING

Effect of Emulsifying Agents On High-Sugar Cakes

Glyceryl monostearate acts similarly to mono- and diglycerides of fatty acids by improving the grain and increasing the volume of high sugar ratio cakes.

Experiments were conducted with a cake formula containing a high ratio of sugar to flour and 2 types of fat—butter and hydrogenated vegetable oil—with and without glyceryl monostearate at 3 and 6 percent fat levels.



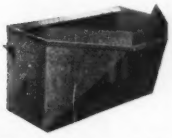
WHY USE 3 TO 5 TRUCKS... WHEN ONLY ONE WILL DO?

In many plants a Dempster-Dumpster, like the one above, operated by only one man, the driver, has replaced 3 to 5 conventional trucks and crews. The reason for this is that one truck-mounted Dempster-Dumpster serves scores of Dempster-Dumpster Detachable Containers up to four times the capacity of the average dump truck body. These containers are built in a wide variety of designs best suited to the type of materials handled—be they bulky, light or heavy . . . solids or liquids . . . trash or rubbish. Containers are conveniently located at accumulation points inside and outside buildings. To illustrate the flexibility of the Dempster-Dumpster System in handling all types of materials in your plant, we show, at right, a few of the dozens of Dempster-Dumpster Containers built to meet every bulk materials handling need. And remember, one truck-mounted Dempster-Dumpster handles all containers, regardless of capacity or design.

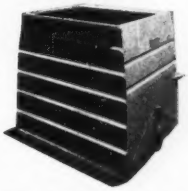
The Dempster-Dumpster System eliminates standing idle time of crews and trucks . . . eliminates re-handling of materials . . . increases efficiency, sanitation and good housekeeping . . . cuts cost of truck equipment and operation tremendously. Without question, it's the most efficient and lowest cost method of bulk materials handling by truck ever devised! The chances are this system will save you thousands of dollars annually. This equipment manufactured and sold exclusively by Dempster Brothers, Inc.

Drop Bottom Container built up to 10 cu. yd. capacity to handle heavy materials.

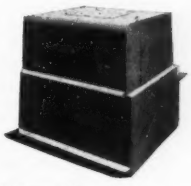
Tank Type Container meeting A.S.M.E. specifications. Capacities up to 1,200 gallons.



Tilt Type with Converged Lip for handling fine aggregate, wet or fluid materials.



Drop Bottom Pressed Steel Type for lighter service.

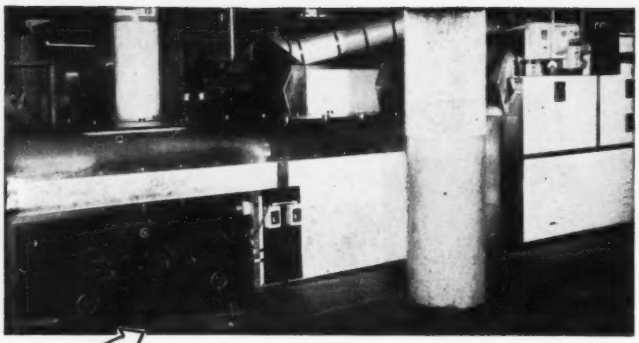


Universal Type built up to 12 cu. yd. capacity with top and end doors.

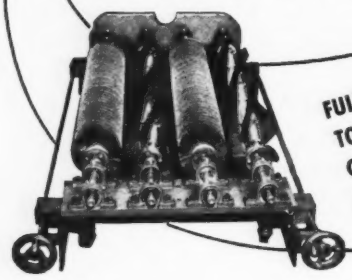
Five cu. yd. container with swivel casters for handling waste blast sand.

WHEN A CONTAINER IS FULL, the Dempster-Dumpster picks it up, hauls to destination and dumps the materials or sets load down intact. These three simple operations, shown above, are hydraulically controlled by driver in truck cab.

DEMPSTER BROTHERS, 782 Shea Bldg., Knoxville 17, Tenn.



Keeps Ovens Running 24 Hours a Day!



FULLER BUILDS MACHINE TO PROVIDE CONTINUOUS CONVEYOR CLEANING at BURRY BISCUIT

When the ovens were set up at The Burry Biscuit Co., Elizabeth, N. J., Burry officials wanted to keep them running 24 hours a day. For continuous operation it became necessary that the Swedish steel conveyor belts be cleaned of deposits continuously.

The Burry people turned to engineers of The Fuller Brush Company for assistance. Fuller engineers designed an improved band cleaning unit to fit under the belt on its return loop to the oven. This machine, manufactured in the Fuller shop, has 4 Fullergript brushes: — 2 steel wire brush coils and 2 nylon filled buffing brushes. The wire brushes thoroughly scrub the hard baked deposits and the nylon brushes buff off the flour and dust.

The brushes are easily and quickly changed. The whole brushing unit may be brought down onto 4 casters and then rolled out from under the belt. A special type of stub shaft at each end of the brush core permits removal of the brushes without disturbing the shaft bearings.

The continuous cleaning provided by the Fuller machines makes it possible for The Burry Biscuit Co. to keep their ovens in operation right around the clock, turning out the famous Burry products.

If you have a situation requiring a special brushing machine, no matter what your product, why not consult us. Our engineers will work from your specifications or start from scratch if you'll outline your problem. Just write to . . .

FULLER BRUSH FULLERGRIPT At home... in business, too

THE FULLER BRUSH COMPANY • INDUSTRIAL DIVISION • 3640 MAIN STREET • HARTFORD 2, CONN.

Cakes were baked at 300, 325, 375, and 425 F.

When batters were studied microscopically, the fat together with occluded air bubbles appeared in clumps in the absence of the emulsifier, whereas, they became more finely dispersed as the percentage of emulsifier was increased. Hydrogenated vegetable oil batters always showed a greater number of gas bubbles than the corresponding butter batters.

In the baked cakes, volume increased and cell structure was improved when glyceryl monostearate was added to the batter. And butter cakes were larger than those made with vegetable shortening. Also, volumes of emulsifier cakes increased with each rise in baking temperature —when no emulsifier was used, cake volume remained constant regardless of baking temperature.

Scores for overall acceptability indicated that cakes made with the emulsifier were preferred to those without, but that no improvement was effected by use of more than 3 percent emulsifier.

Desirability of cakes containing emulsifier increased with each increase in baking temperature. This indicates that the stabilizing effect of the emulsifier is greatest when proteins are coagulated early in the baking process.

Digest from "Cake Structure and Palatability As Affected by Emulsifying Agents and Baking Temperatures," by M. E. Jooste, and A. O. Mackey, *Food Research*, 185-96, May-June, 1952.

MISCELLANEOUS

Testing Compressed Air

Rapid test methods should be available for determining sterility of compressed air or CO_2 that come in contact with food or beverages.

Nutrient agar plates (pH 7.4) are preferable for indicating bacterial population, since molds and yeast quickly overgrow bacteria on wort (pH 4.85).

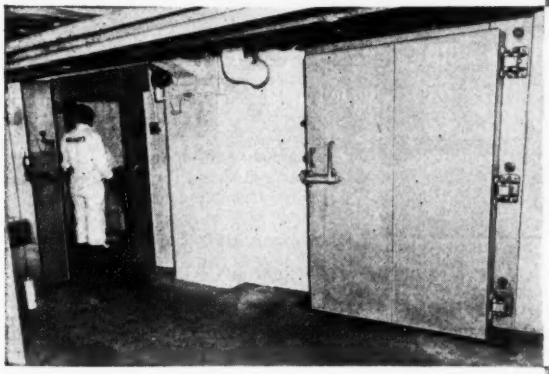
The Hollaender and Dalla Valla apparatus, in which air impinges on the agar after passing through an inverted 3-in. funnel is recommended for routine observations. A calcium alginate wool filter also gives good results. The filter is sterilized by autoclaving, then placed in a $CaCl_2$ tube. After a suitable quantity of air has passed through the tube, filter is removed aseptically and dissolved in a 1 percent solution of sterile sodium hexametaphosphate and plated in the usual way.

Digest from "Bacteriological Testing of Compressed Air Supplies," by H. F. P. Webber, L. Taylor and J. Compton, *Journal of the Institute of Brewing*, Vol. 58, No. 1, 51-58, 1952.

JAMISON doors really hold up under hard usage

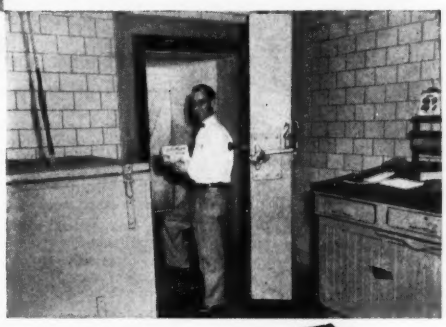
— reports Hershey Creamery Co.

The Hershey Creamery plant in Harrisburg, Pa., produces over 32,500,000 pint packages of ice cream a year—the world's largest producer in this size. Cold storage rooms in the plant get hard daily use. The plant superintendent, H. E. Sauers, in commenting on storage room traffic said: *"We are well pleased with the way the Jamison Doors stand up under the extreme usage they get in our plant."*



PACKAGE STORAGE ROOM. Jamison Metal Clad Super Freezer Doors maintain a tight seal at all times in these 25° below zero rooms. Positive seal makes refrigeration more efficient by preventing frost from accumulating on refrigeration coils. Thickness of insulation in doors equals that of walls.

PLATFORM BULK STORAGE ROOM. 2½ gallon packages of ice cream are stored in this 30° below zero room. Patented Super Freezer Fastener on metal clad door is most efficient fastener available for doors of this type. H. E. Sauers, Plant Supt., is keeping door in check.



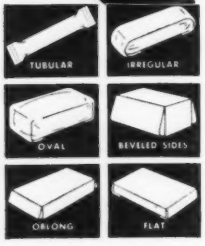
FRUIT STORAGE ROOM. A Jamison Standard Door is used for this room storing fruits and flavors of all types. Temperature of room is held to 40° above zero. Completely metal clad doors insure maximum sanitation and simplify cleaning operations.

JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

Jamison Cold Storage Door Co., Hagerstown, Md., U.S.A.
World's largest builders of cold storage doors—specialists for over 50 years

- CANDIES AND CONFECTIONS
- BAKERY PRODUCTS, FOODS
- SOAPS, TISSUE HANKIES
- PREPACKAGED MEATS
- BANDAGES, CAMERA FILM
- ICE CREAM BARS AND NOVELTIES



and 101 other miscellaneous products of every type and description

No matter how odd or irregular the shape, how fragile or solid the product — you can eliminate packaging bottlenecks and wrap it *faster, cheaper* and *better* on the automatic continuous feed, Campbell Wrapper. Normal operation wraps 150 single or multiple units per minute, with many special installations running as high as 300! Labor savings are tremendous, as in most cases only one person is needed for feeding and operating. Machine automatically positions imprinted label and seals wrap in most any style desired — including hermetical sealing. Likewise, special automatic feeds can be furnished. No other wrapping machine is so versatile — so adaptable to so many different kinds of products. Send us a sample product — we'll be glad to help solve your packaging problems.

We are contributing to the nation's defense program by providing a large part of our increased production facilities for building precision armaments.

Write for this booklet today

New York: 55 West 42nd St.

Campbell WRAPPER

HUDSON-SHARP MACHINE CO. • GREEN BAY, WIS.

Manufacturers of Aniline and Gravure Presses, Folders, Interfolders, Laminators, Waxers, Embossers, Slitters, Sheeters, Roll Winders, Packaging Machines, Crepers and Tissue Converting Units.

Packaging Mixes

—*Continued from page 78*

filler that takes all the heavy work out of the 200-lb. bag operation. After a bag is lifted onto the spout, the machine clamps it, weighs in the flour, lowers the bag automatically as it is being filled, and moves it to the sewing machine.

Built-In Vacuum Cleaner

Flour handling operations necessarily are associated with dust. And to make plant cleaning easy, as well as to serve the vacuum hoods over equipment, Ballard connected a 25-hp. Hoffman vacuum system to pipes placed throughout the plant. Flexible hose can be connected wherever cleaning is to be done, and as many as six hoses may be in operation simultaneously.

The plant also has a 30-hp. American Filter dust collector system which uses paper-bag type filters. And the big flour bins have air outlet ducts which discharge into sleeve-type cloth filters to trap the dust.

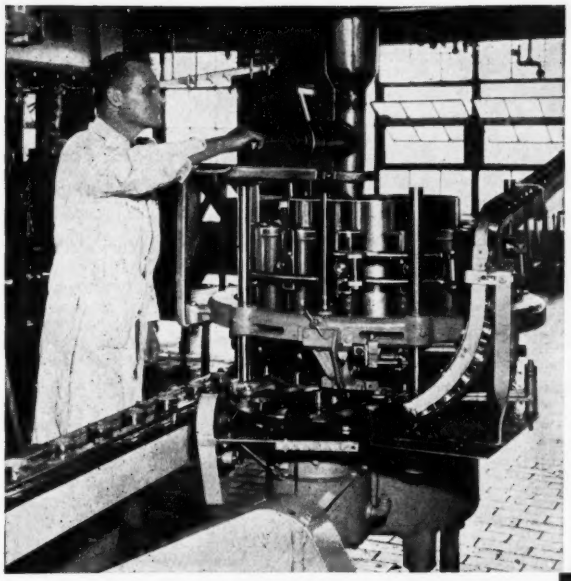
Advanced Bin Engineering

Surrounding the battery of 36 huge storage bins is a 6-in. space that is connected to an air-circulating and heating system. This will be used when the new mill is built and warm 95-deg. F. flour will be taken directly into the bins from the mill. Without it, moisture would condense in the bins.

The same system permits quick exhaust of fumigant from the bins for quick start-up on Monday mornings after week-end fumigation. The bins can be fumigated in two ways: (1) by screwing fumigant cans onto nipples attached to the bin manhole covers, or (2) by sealing off the bins at the 7th and 3rd floors and introducing the fumigant into the air-circulating space. From 5 to 6 lb. of fumigant is used per bin, but frequent fumigation is not necessary in the new concrete and steel building.

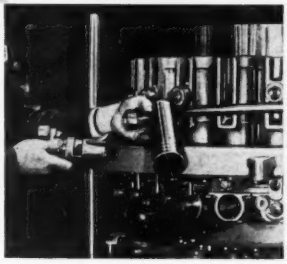
Fumigation Chambers

Two fumigation chambers treat corn meal and other bagged ingredients. Made of concrete blocks, spray coated inside with bitumen to make them gastight, the chambers measure 16x20x12 ft. A cylinder containing the liquid fumigant is connected, outside the chamber, to a pipe extending to the center of the ceiling. To exhaust the gas, the door is cracked and a 1/20-hp. exhaust kitchen-type fan located in the



THIS 14-STATION PFAUDLER Rotary Piston Filler fills cans of potted meat cleanly and rapidly at the Indianapolis plant of Kingan & Co.

Recent Improvements Make PFAUDLER PISTON FILLERS faster, more accurate, easier to operate



PISTONS and self-compensating cut-off valves can be easily removed by hand for rapid cleaning. An exclusive Pfaudler feature.

Here are some recent improvements in Pfaudler Piston Fillers designed to further cut your filling time, decrease spillage, assure cleaner fill —and provide longer service life.

SMOOTHER CONTAINER INFEED CONTROL because Pfaudler Piston Fillers now have a can stop on the chute which permits the operator to more easily regulate flow. An outboard bearing on the feed screw maintains alignment of the screw. A lock screw on the feed case maintains correct gear setting.

SMOOTHER FILLING is provided by a uniform motion cam assuring a more even fill. A valve retaining guide keeps valves in correct position, lengthening valve roller life and permitting even fill.

FAST, EASY CAM TRACK ADJUSTMENT—because track is now hinged at two pivot points. A lubrication header enables the operator to more easily lubricate the entire filler.

LONGER SERVICE LIFE because valve trip cams are now made of oil hardened steel to last longer under rough wear. A solid integral valve roller arm eliminates wear on keys, keyways and screws. And a stainless steel strip on the feed trip cam rail reduces wear on that member.

FOR RAPID, ACCURATE filling at lower cost it will pay you to specify Pfaudler Piston Fillers. Capacities range from 100 to 600 containers per minute depending on the viscosity of the product and type of container. Pfaudler "no can-no fill" feature prevents wasteful spillage. Cleaning costs are reduced, too. Pistons and cut-off valves are easily removable by hand. No tools needed. Get the facts on new, improved Pfaudler Piston Fillers today. Mail the coupon.

Pfaudler

THE PFAUDLER CO., ROCHESTER 3, NEW YORK
Engineers and Fabricators of Food Processing Equipment

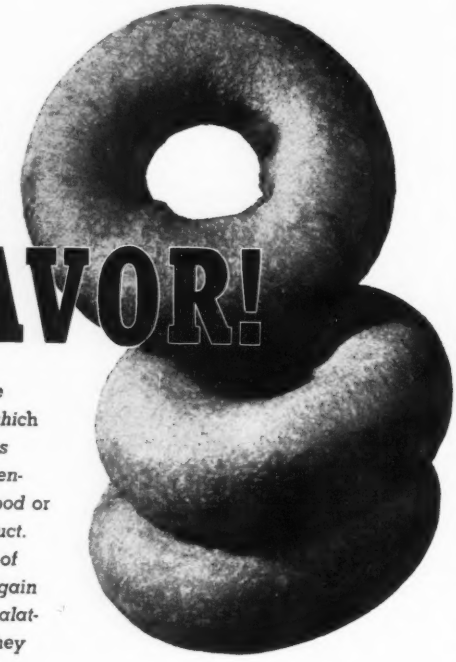
Gravity Fillers · Piston Fillers · Steam Peelers · Deaerators · Vacuum Pans · Evaporators

THE PFAUDLER CO.
Dept. FE-8, Rochester 3, N. Y.

Please send me Bulletin 876 with full details on Pfaudler Piston Fillers.

Name_____
Title_____
Company_____
Address_____
City_____ Zone____ State_____

IT'S ONLY AS GOOD AS ITS FLAVOR!



FLAVOR is the yardstick by which most consumers measure their enjoyment of a food or beverage product. Manufacturers of such products gain the utmost in palatability when they use the matchless flavoring specialties offered by FRITZSCHE . . .
A FIRST NAME IN FLAVORS SINCE 1871.

Write us for Catalog C

FRITZSCHE *Established* 1871 **Brothers, Inc.**

PORT AUTHORITY BUILDING, 76 NINTH AVENUE, NEW YORK 11, N. Y.

BRANCH OFFICES *and* *STOCKS: *Atlanta, Georgia, Boston, Massachusetts, *Chicago, Illinois, Cincinnati, Ohio, Cleveland, Ohio, *Los Angeles, California, Philadelphia, Pennsylvania, San Francisco, California, *St. Louis, Missouri, *Toronto, Canada and *Mexico, D. F. FACTORY: Clifton, N. J.

top of one wall is started. Each chamber holds 30 pallet loads, 15 bags per pallet.

End (Resume reading on page 79)

CO_2 vs. Beverage Bacteria

—*Continued from page 85*

The above procedure was repeated with an additional 60 bottles, except that here the quantity of sucrose solution was changed to produce a Brix of 8.5 in the finished beverage. Carbonation, pH, and inoculations were similar to the above.

This gave 120 bottles with pH of 4.5 and 150 yeast cells. They fell into three groups on the basis of carbonation, and two groups on the basis of sucrose content.

Plated samples, taken daily from bottles incubated at room temperature, gave the following results (see Fig. 2):

1. At 5 volumes CO_2 pressure and 12 Brix—*sterility on 10th day*. At 8.5 Brix—*sterility on 3d day*.

2. At 4 volumes CO_2 and 12 Brix—*sterility on 13th day*. At 8.5 Brix—*sterility on 8th day*.

3. At 3 volumes CO_2 and 12 Brix—*sterility on 20th day*. At 8.5 Brix—*sterility on 17th day*.

In all cases, sterility was accomplished in fewer days where the Brix was lower. This may be attributed to the fact that the lower sugar content affords less nutrient for the metabolic functions of the organisms in their respective life cycles.

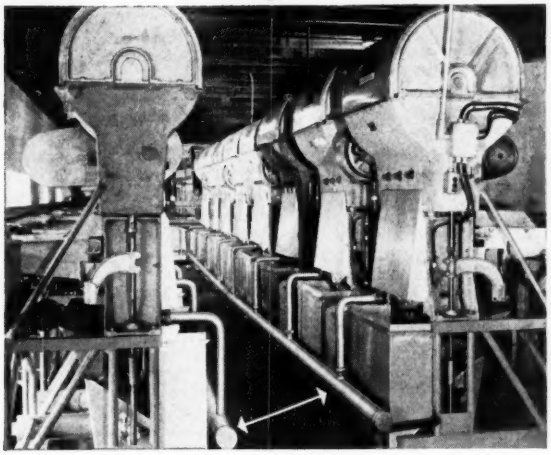
It is not my intent to create the impression that, because of the sterilizing qualities of CO_2, as shown above, the bottler may relax his application of sanitizing procedures—for they have been found absolutely necessary for the production of sterile products. Actually, the conditions established in the laboratory seldom are attainable in the plant.

The organisms which may infect a product may also be, and usually are, greater in number and more virulent than those employed here. It was not my intent to establish definite conditions and predict that sterility will follow, but rather to demonstrate the effects of variable factors, such as Brix, pH, carbonation, and incubation time in relationship to each other and to condition of finished product.

Those products which have a specific susceptibility for spoilage may, under conditions not described here, be controlled by a constant pressure of CO_2 when the other factors are maintained in proper balance.

End (Resume reading on page 86)

You Safeguard TASTE with lines made of *Carpenter* Stainless Tubing



As this plant's Superintendent would tell you, these 4" citrus juice lines safeguard the product's most important feature . . . its TASTE.

And in these days, when tubing or pipe may not always be in your plant when you'd like it, *long life* and *easy maintenance* become more important than ever before. That's what we mean when we say you get "more than corrosion resistance" from Carpenter Stainless Tubing.

When you want the sanitary advantages of Stainless, plus engineering or fabricating help that keeps processes going the way you planned them—put in a call to Carpenter, or your Carpenter Stainless Tubing Distributor. Our 25 years of experience with Stainless Tubing problems can be used to your advantage.

THE CARPENTER STEEL COMPANY
Alloy Tube Division, Union, N. J.
Export Dept., The Carpenter Steel Co., Port Washington.—"CARSTEELCO"

Carpenter
STAINLESS TUBING

Analysis — Tolerance — Finish

— guaranteed on every shipment

THE U.S. NEEDS YOUR STEEL SCRAP NOW

FOR THE FOOD INDUSTRY

BALDWIN SUPERTEX*
*Reg. U.S. Pat. Off.
WHITE NEOPRENE CONVEYOR BELT

WASHABLE
Easily cleaned.

WATERPROOF
Minimum shrinkage even when run under water.

TASTELESS
Food products can be carried directly on the belt.

NON-TOXIC, ODORLESS
Safe. Meets all sanitary and health requirements.

RESISTS HEAT
Used where heat is up to 250 degrees F.

STRETCHES LESS
Multiple plies of lightweight CLOSE WOVEN duck.

LEAVES NO IMPRESSION
Perfectly SMOOTH top cover.

HAS BONDED EDGES
Prevents fraying.

RUNS OVER SMALL PULLEYS
Full width fabric. No folds. No splices. Remarkable flexibility.

ENDLESS WITHOUT SEWING
Multiple step-lap outlasts belt itself.

ACID-ALKALI RESISTANT
Important in many industries besides food processing.

Send for CATALOG and get all facts, technical data and suggested uses.

Get the facts too on TREAD-TOP for conveying packages up inclines of 25-30 degrees. Write for technical data.

BALDWIN BELTING, INC.
76 MURRAY ST., NEW YORK 7, N. Y.

Questions & Answers

THIS MONTH'S PROBLEM

Question—We employ a unit for continuously pasteurizing bottled beer. Employing a "walking beam" conveyor, this machine automatically preheats, pasteurizes, and cools the beer. Heating and cooling is accomplished by water sprays delivered through a recirculating system. However, we are up against a problem that we've been unable to lick—recording the temperature of individual bottles of beer traveling through. Temperature recorders in different zones of the unit do not, of course, measure the temperature inside the bottles. Can you suggest a possible solution?

Answers to June Problem

The Question Was—Our Concord grape process involves chuting bunches of grapes into a stemmer, which separates pulp from stems, and then packing the pulp into barrels for freezing. However, we would like to go one step further and remove the seeds from this homogeneous mass of skins, flesh, and juice. Would you kindly advise a method?

Answer—We understand that certain citrus processors employ a simple orange-juice extracting unit that should work in your case.

This unit (see diagram) comprises multiple pairs of 2½-in.-dia. stainless steel rolls, pitched at a 10 to 20 deg. angle. The rolls in each pair counterrotate at 1,425 or 1,750 rpm. Distance between the rolls should be slightly less than the diameter of the grape seeds.

Seeds are removed in this manner: From a hopper, stemmed grapes are fed to diverting plates, which distribute them over the rolls. Next, the rolls drag juice, skins, and pulp between slots and into a trough. Seeds, on the other hand, travel the length of the rolls and then fall into another trough.

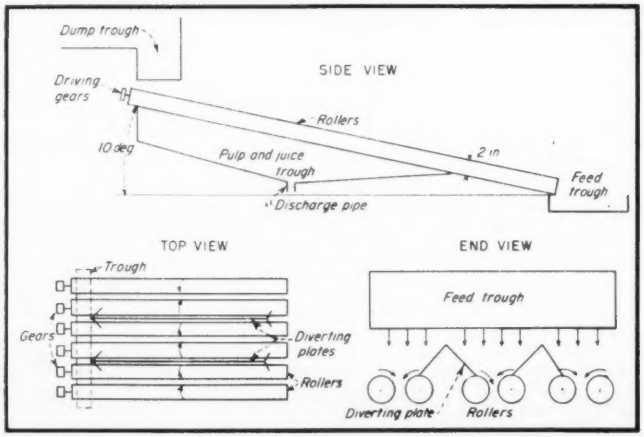
Here are some additional suggestions: first try running the mixture of skins, pulp, juice, and seeds through a separating reel of the type employed for removing skins from peas or kidney beans. Slots between the reel bars will permit juice to pass through, and, quite possibly, allow the skins to run through as well. As a result, the seed-containing pulp should remain behind.

Second, try putting the seed-containing pulp through a paddle-type finisher with perforations small enough to retain the seeds. Pulp going through the finisher screen should then be free of seeds and it could then be added back to the juice and skins recovered by the reel-type separator.

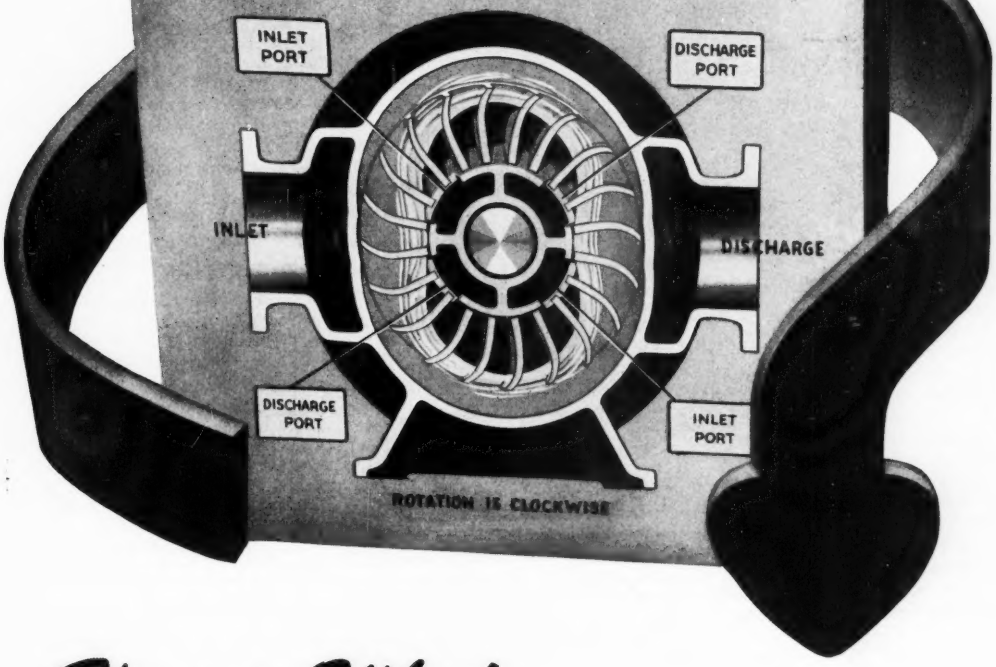
Problem With Frying Fumes

Question—The exhaust from our deep-fat fryers presents a real problem. When the wind is from the north, the fumes blow into the windows of nearby homes, and there is no end to the complaints.

We fry fish in 40-lb. lots at 340 deg. F. and French fried potatoes in 30-lb. lots at 365 deg. F. Our exhaust fans are close to the roof, and they turn at 3,600 cfm. Can you suggest any steps that we might take to curb this nuisance?



Nash Instrument Air Compressors deliver only clean air, free from oil or dust, and without filters



Here is Why!

You can dispense with oil filters and dust filters when you install ®Nash® Clean Air Compressors. You can save the cost of maintaining these devices. You can greatly reduce instrument maintenance costs. For the Nash employs no internal lubrication, therefore no troublesome oil is in the delivered air. Moreover, air from a Nash is thoroughly washed and cooled as it passes thru the pump. Dust in the plant atmosphere, even fly ash, is immediately removed.

®Nash® Clean Air Compressors are simple, with only one moving element. No valves, gears, pistons, sliding vanes, or other enemies of long life and constant performance complicate a Nash. No aftercoolers are needed. You will find it profitable to investigate these pumps, now.

No oil filters.
No dust filters.
No internal lubrication to contaminate air handled.
No internal wearing parts.
No valves, pistons, or vanes.
Non-pulsating pressure.
Original performance constant over a long pump life.
Low maintenance cost.

NASH ENGINEERING COMPANY
373 WILSON, SO. NORWALK, CONN.

MORE PRODUCTION from each PRODUCTION DOLLAR

An immediate way to realize more production per manhour—and at minimum investment—is by the installation of CM Electric Hoists. By making use of non-productive overhead space you can speed the flow of parts and assemblies... raise employee efficiency levels... reduce fatigue. As anyone can operate these CM Electric Hoists, skilled manpower is released for other production operations. Valuable floor space is made free for added production. Here are two CM electric hoists favored particularly by plant production executives.

CM METEOR Capacities: ½ to 5 tons

Low headroom wire rope electric hoist for heavy duty service. Single and two speed models. Push button control. High efficiency airplane type cooling. Helical gears. Fully enclosed operating parts. Precision bearings at all rotating points. Plain, geared or motor driven trolleys.

CM COMET Capacities: ⅛ to 2 tons

Portable, compact and rugged electric chain hoist. Available in push button and pendant rope control models. Equipped with flexible HERC-ALLOY load chain. Fully enclosed working parts. Upper and lower safety limits. Permanently lubricated. Plug in on 110, 220 or 440 volt power line. Used extensively in production operations.

● **CM Electric Hoist Catalog** sent on request with prices and name of your local CM distributor. Production executives find our catalog a good source of hoist information.

CHISHOLM-MOORE HOIST CORPORATION

(Affiliated with Columbus McKinnon Chain Corporation)

GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.

SALES OFFICES: New York, Chicago and Cleveland • Distributors Everywhere

Answer—Probably the most easy, quickest, and most inexpensive solution would be the installation of smokestacks to take your exhaust from fans and dissipate it higher in the atmosphere. Use 8-in. dia. galvanized metal stacks of 15-18 ft. height.

Here's another possible solution: Construct a metal box in front of your exhaust-fan intake and loosely pack into it steel wool or glass fiber. Then install a drain at the bottom of the box to collect the condensed fat droplets. By all means, make certain that the packing isn't too tight, otherwise fumes will back up into your plant.

You might look into the possibility of using filter screens in place of the loose-packed steel wool or glass fiber.

Problem With Saddle Labels

Question—We seal our thermoplastic cellophane bags with printed saddle labels. From time to time, these labels come off, and product losses result. The labels are crimped and heat-sealed to the bags. Have you any suggestions on how these regular paper labels can be made to adhere better to the top of the bags?

Answer—Undoubtedly, you are relying on crimping and sealing of the labels by the thermoplastic coating on the bags and not on the type of paper label. Backs of such labels should be coated with a heat-sealable material, which easily and securely adheres to the bags.

We suggest that you obtain samples of various types of heat-sealable labels and try them.

Another suggestion: If you are using a saddle-labeling machine, make sure that the labels are accurately positioned so that the bags are flush-sealed. Also make sure the temperature of your crimper-type heat-sealing plates is neither too high nor too low.

How Would You Do It?

Readers are invited to submit to FOOD ENGINEERING answers to questions in this department, especially to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.

What Is Your Problem?

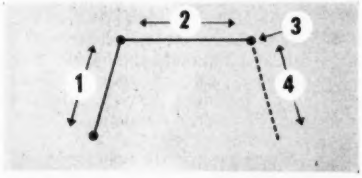
Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

If You're Batch-Cooking You Can Use This Inexpensive Control

Here is a recorder-controller planned especially for economically controlling processes like batch cooking. The Gotham Elapsed Time Recorder-Controller does the essential control jobs easily and accurately. First of all, it brings the batch up to maximum holding temperature fast. It holds the batch at that temperature for a predetermined period. It shuts down the process at the end of the cooking period. Those are its three standard functions. Automatic venting or cooling functions can be added. Also available with a pressure, instead of temperature, system.

Write for full information about the Elapsed Time Recorder-Controller and other Gotham Controllers. They're in Catalog 500.



This Is What the Gotham Elapsed Time Recorder-Controller Does

1. Brings controlled variable (temperature or pressure) up to maximum fast.
2. Holds variable at maximum for predetermined period.
3. Shuts down process.
4. Automatic venting or cooling can be added.

Gotham Elapsed Time Recorder-Controller

SPECIFICATIONS

CHART SIZE: 12"

CASE: Standard - black crinkle; smooth black or white may be obtained.

ACTUATION: Vapor, Gas or Mercury for temperature. Pressure elements available.

CHART DRIVE: Spring wound or synchronous motor.

CONTROL SYSTEM: Pilot relay with adjustable sensitivity for 0 to 30% throttling band is standard, two position or 100% throttling band available.

HOLDING PERIOD: Standard 0 to 3 hrs. Other periods available.

Keep Everything Under Control With Gotham

GOTHAM INSTRUMENTS

Division of AMERICAN MACHINE AND METALS, INC.

Dept. 9, 233 Broadway, New York 12, New York

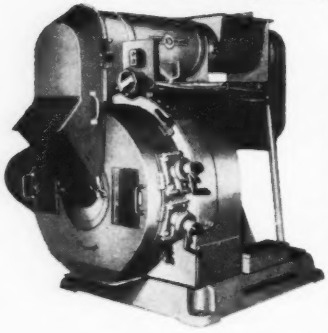
 For more information, use post card on last page.

FOOD VALUES RETAINED
MOISTURE CONTENT STABILIZED
HANDLING COSTS REDUCED

with the S-W PELLET ACE

If you want your product to reach your market fresher, with food values retained and moisture content stabilized—pelleting is your answer. Pelleted products are easier to handle, easier to ship, easier to sell.

For example, processors of alfalfa have found that the carotine content of alfalfa is substantially higher when the alfalfa is shipped in pelleted form rather than in bulk. They have found, too, that handling pellets is easier, cleaner, and altogether pleasanter than handling bulk alfalfa.



The Sprout-Waldron

PELLET ACE

produces pellets or cubes ranging from 3/32 to 1 inch in diameter in remarkably uniform lengths. Its capacity is tremendous—its operating cost amazingly low.

At Sprout-Waldron you will find an impressive file of successful case histories on the pelleting and cubing of many products. This unequalled background and experience is coupled with willingness and ability to help you accomplish any objective along these lines.

Ask your *SPROUT-WALDRON MAN* to give you the complete details on the Pellet Ace, or write for Bulletin 94 to Sprout-Waldron & Co., Inc., 35 Logan Street, Muncy, Pennsylvania.

SW MUNCY, PA.

SPROUT-WALDRON

The Best in PROCESSING EQUIPMENT *Since 1866*

229

Making Colored Margarine

Question—Would you please furnish us with a good formula and production details for colored margarine?

Answer—Formulas vary, depending upon the emulsifiers, flavors, and refined oils employed. Vegetable oils (used alone or in combination) include cottonseed, soybean, peanut, and coconut.

Here is a simple formula: Refined, deodorized cottonseed oil, 850 lb.; the same oil hydrogenated, 1,150 lb.; ripened milk, 55 gal.; salt, 70 lb.; vegetable lecithin, 3-7 lb.; vitamin A concentrate, 9,000 USP units per pound of finished product; diacetyl flavor (if desired), 1 oz.; and oil-soluble yellow dye, sufficient to color.

Actually, there are three principle steps in the manufacture of colored margarine—ripening the milk, blending the ingredients, and solidifying and working the emulsion.

To ripen the milk: Bacterial cultures or starters, which have the ability of producing diacetyl and other substances with desirable flavors and aromas, are obtained from a laboratory specializing in their selection and propagation. A daily supply of cultured milk is maintained in quart bottles by inoculation, followed by incubation at 70 deg. F. for 18 hr. Good practice is to maintain these cultures for two weeks, then replace with fresh ones from the laboratory.

The starter is prepared by pasteurizing the milk, cooling it to 70 deg. F., and adding it to a vat with 1 qt. of culture. After 10-14 hr. of ripening, cool the batch as rapidly as possible, with agitation, to 35-40 deg. F.

Now to blending the ingredients: To the cultured milk add the salt and diacetyl. Next, put vitamin concentrate, lecithin, and powdered oil-soluble color in the oils. At this point, charge the oil mixture (115 deg. F.) into an emulsifying tank equipped with an agitator. Then slowly introduce the salted, ripened milk to produce a water-in-oil emulsion.

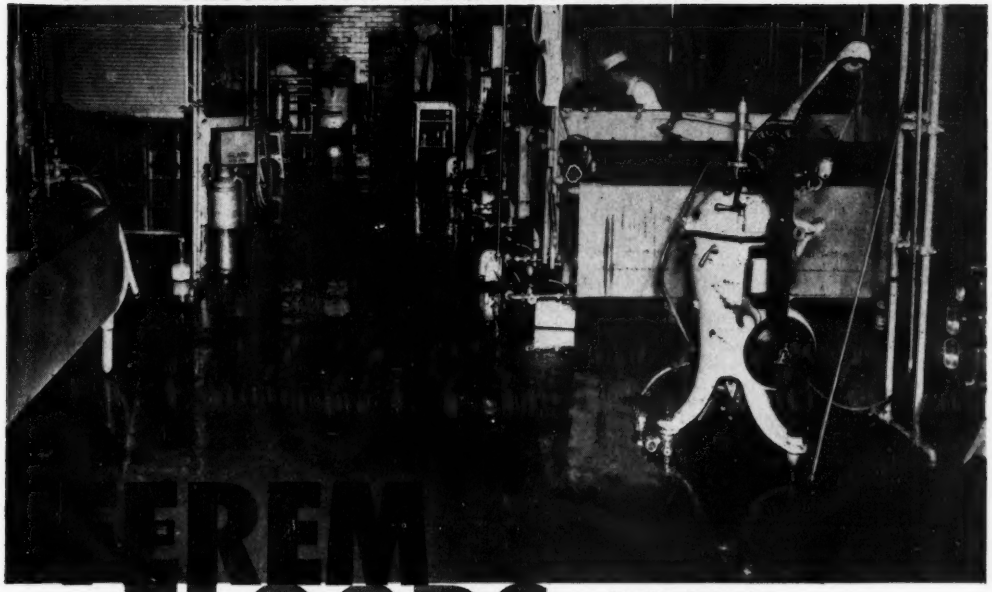
Finally comes the solidifying and working process. Pump the emulsion through a closed, continuous heat-transfer unit that simultaneously mixes, chills, and delivers the finished product under pressure to molding machines, ready for packaging.

Dehydrated Soup Formula

Question—Would you please furnish us with a formula and processing information for preparing a top-quality dehydrated chicken noodle soup mix?

Answer—The following formula is

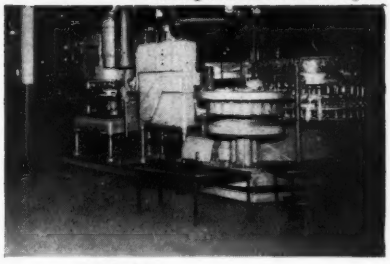
TOUGH FLOORS FOR TOUGH CONDITIONS



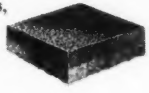
FEREM BLUE TEMPER FLOORS

Smith Dairy Products Co.

Bottling house of Miller Brewing Co.



In your plant you can have dense, ductile heavy duty floors, showing no noticeable wear for long periods and involving practically no upkeep costs, even when subjected to abrasive traffic and shock. Such floors are constructed with Ferem, the "Blue Temper" component in the floor topping, replacing sand, stone and silica. Ferem is used in heavy duty floors, loading platforms, corridors and runways in newly constructed buildings, or when replacing worn or eroded floors. Ferem is resistant to the corrosive action of chemical solutions . . . and has proven satisfactory under the wet floor conditions of many industries.



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Breweries, Beverage Plants	Chemical Plants
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A. C. HORN COMPANY, INC.,
Long Island City 1, N. Y.

FE-2

Please send me ☐ complete data on FEREM FLOORS

☐ free copy of your 96-page Construction Data Handbook

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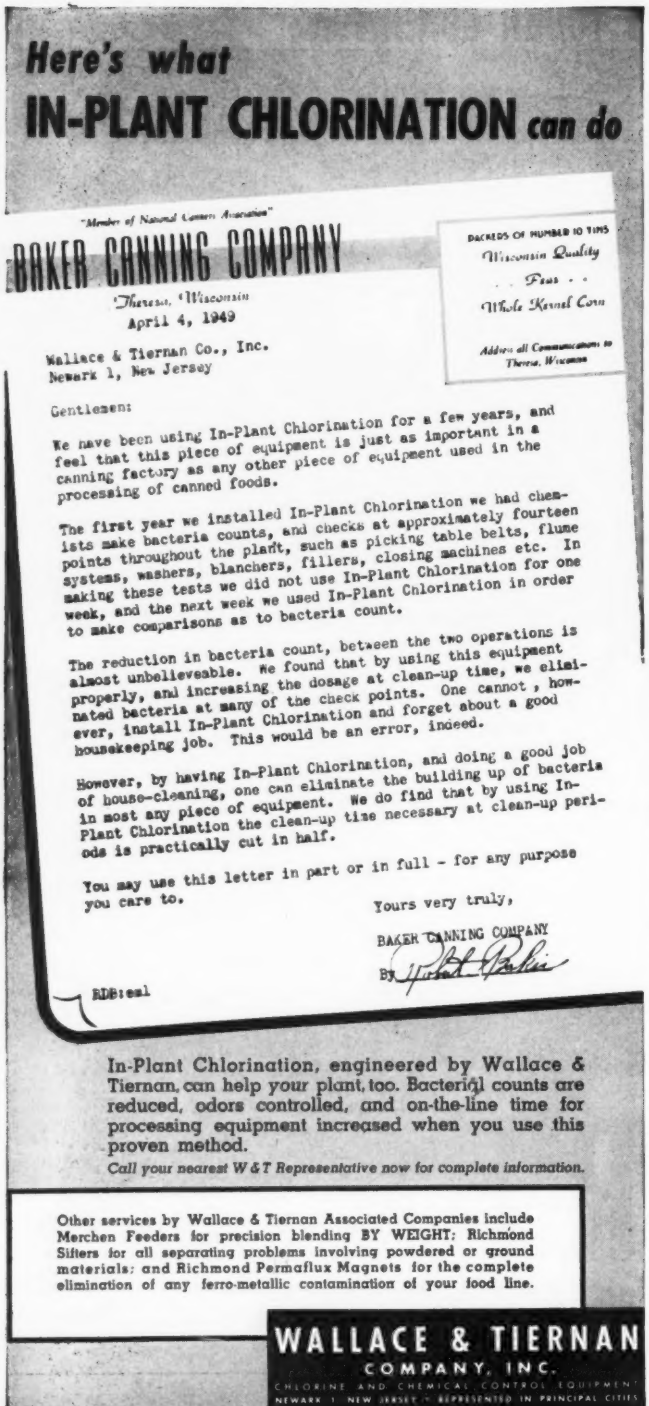
CITY_____ STATE_____


Here's what
IN-PLANT CHLORINATION can do
"Member of National Canners Association"
BAKER CANNING COMPANY
Theresa, Wisconsin
April 4, 1949
PACKERS OF HUMBLE 10 TINS
Wisconsin Quality
Peas
Whole Kernel Corn
Address all Communications to Theresa, Wisconsin
Wallace & Tiernan Co., Inc.
Newark 1, New Jersey
Gentlemen:
We have been using In-Plant Chlorination for a few years, and feel that this piece of equipment is just as important in a canning factory as any other piece of equipment used in the processing of canned foods.
The first year we installed In-Plant Chlorination we had chemists make bacteria counts, and checks at approximately fourteen points throughout the plant, such as picking table belts, flume systems, washers, blanchers, fillers, closing machines etc. In making these tests we did not use In-Plant Chlorination for one week, and the next week we used In-Plant Chlorination in order to make comparisons as to bacteria count.
The reduction in bacteria count, between the two operations is almost unbelieveable. We found that by using this equipment properly, and increasing the dosage at clean-up time, we eliminated bacteria at many of the check points. One cannot, however, install In-Plant Chlorination and forget about a good housekeeping job. This would be an error, indeed.
However, by having In-Plant Chlorination, and doing a good job of house-cleaning, one can eliminate the building up of bacteria in most any piece of equipment. We do find that by using In-Plant Chlorination the clean-up time necessary at clean-up periods is practically cut in half.
You may use this letter in part or in full - for any purpose you care to.
Yours very truly,
BAKER CANNING COMPANY
By
RDB:eal
In-Plant Chlorination, engineered by Wallace & Tiernan, can help your plant, too. Bacterial counts are reduced, odors controlled, and on-the-line time for processing equipment increased when you use this proven method.
Call your nearest W&T Representative now for complete information.
Other services by Wallace & Tiernan Associated Companies include Merchen Feeders for precision blending BY WEIGHT; Richmond Sifters for all separating problems involving powdered or ground materials; and Richmond Permaflux Magnets for the complete elimination of any ferro-metallic contamination of your food line.
WALLACE & TIERNAN
COMPANY, INC.
CHLORINE AND CHEMICAL CONTROL EQUIPMENT
NEWARK 1 NEW JERSEY REPRESENTED IN PRINCIPAL CITIES
I-33

a good one: Chicken fat, 9 lb.; hydrogenated cottonseed oil, 12 lb.; chicken meat (shredded, dehydrated), 15 lb.; carrots (dehydrated), 15 lb.; onions (dehydrated), 30 lb.; celery leaves (dehydrated), 3 lb.; salt (dry, finely granulated), 6 lb., 13¼ oz.; white pepper (fine grind), 2.4 oz.; and egg noodles (thin, ribbon-type for soup), 210 lb.

Total yield per batch is 300 lb.—the equivalent of approximately 1,500 2½-oz. packages.

In preparing, blend all ingredients except the fats and noodles in a dry mixer. Melt the fats in a steam-jacketed kettle and mix uniformly with dry ingredients in the mixer. Weigh out ¾-oz. portions of this mix and package in small greaseproof envelopes (loose mix). Or press the mix into ¾-oz. cakes, then seal in greaseproof bags.

Now, into larger greaseproof envelopes put either the cakes or loose mix, together with 1¾ oz. of noodles, and heat-seal the completed package.

Wants to Make Mustard

Question—Please furnish us with a formula and processing details for making prepared mustard.

Answer—In manufacturing a prepared mustard, you will have to experiment with the type mustard seeds available. In general, there are two kinds—yellow and brown.

A typical formula including both seeds consists of: Water, 61 gal.; vinegar (90 grain), 41 gal.; spiced vinegar, 1 gal.; brown mustard seed (Calif.), 83 lb.; yellow mustard seed (Calif.), 67 lb.; salt, 37½ lb.; tumeric, 3½ lb.; mixed spices, 3 lb.; and Worcestershire sauce, 1 qt.

The spice vinegar contains: Water, 2½ gal.; vinegar (90 grain), 2½ gal.; and spices, 1¼ lb. Ground spices going into this diluted vinegar are: Garlic, 5 lb.; clove, 3 lb.; celery seed 3 lb.; coriander seed, 2½ lb.; ginger, 2 lb.; cayenne, 1½ lb.; mace, ½ lb.; caraway seed, ¼ lb.; and a touch of bay leaves.

The 3 lb. of mixed, ground spices contain: Allspice, 3¼ lb.; cinnamon, 2½ lb.; white pepper, 1½ lb.; cloves, 1 lb.; and cayenne, 1 lb.

Now to making the mustard:

Crush the seeds by running them through steel rolls, or grind them in a mill. A word of caution: Set the rolls or the plates in the mill carefully to avoid overheating.

Add the liquids, including sauce, into a mixing tank and agitate. Then introduce the dry ingredients and mix for about 5 min. Pump mixture to mill equipped with grinding stones (Buhr stones from France or granite

What do you know that they didn't realize?

If you'd told these gentlemen back in 1905 that someday meat and fowl would be available in cans, they probably wouldn't have believed you.

Today, of course, as you know, there are dozens of different containers for packaging such products. One of the best known is the key-opening Canco container you see below.

This is one of hundreds of containers that American Can Company has pioneered since 1901.

Canco will continue to pioneer improvements for its customers in different businesses . . . in different fields.

AMERICAN CAN CO.

CANCO

NEW YORK
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CONTAINERS— to help people live better

EXACT WEIGHT Scales checkweighing butter prints to eliminate packaging shrink. Jerpe Commission Co. Inc., Omaha, Nebr.

Scales—a Key Factor in Cost Control . . .

Few food processing operations are without scales. Practically all modern methods today employ weighing units to control uniformity, grade for quality, assure weight accuracy in the individual consumer package. The right scale in the right place is just part of modern food production with checkweighing the largest user in number of units. No industry we serve controls costs more successfully through weighing than does the food processor generally. Waste is eliminated . . . quality protected . . . time and labor saved. For 35 years now EXACT WEIGHT Scales have met the challenge with weighing units to produce better food products easier, faster, cheaper and more profitably. Units are available for wet or dry packaging, cereal operations, fresh, canned and frozen foods. Write for details for your plant.

EXACT WEIGHT Scale Model #213-S, the most popular consumer packaging scale—Features (1) high speed operation due to extremely short platter fall, (⅛") (2) end tower construction which takes up less bench space, and permits uninterrupted production across the scale while commodities are being weighed all in direct line of vision, 1 lb. beam, notched type. Dial 1 oz. over and under x ¼ oz. graduation—Capacity to 3 lbs.

EXACT WEIGHT SCALES

Industrial Precision

THE EXACT WEIGHT SCALE COMPANY

910 W. Fifth Ave., Columbus 8, Ohio

2920 Bloor St., W., Toronto 18, Canada

stones from New York and NewHampshire are used).

From the mill, run the mustard into a mixing tank, and agitate while pumping the product to a second (finishing) mill. Finally, pump the mustard into a storage tank and age about one week before filling into jars.

To control degree and uniformity of grind, run both mills at 65 rpm. and at a capacity of 60 gal. per mill per 8-hr. shift. Clearance between stones should be about 0.003 in. And the stones must be dressed every 4-5 weeks to avoid presence of visible specks from seed culls in the product.

Cane Vs. Beet Sugar

Question—As a small maker of preserves and jellies, our company is in a quandary as to whether beet or cane sugar is better for our process. We have been buying sugar in 100-lb. bags from three vendors, but seem to receive varying results with the sugar.

Answer — The relative merits of cane and beet sugar have been widely discussed. Either type may come in good, bad, or indifferent grades. When of good quality, both are capable of satisfactory results in your process. If in doubt about your sugar, check it for color, odor, and freedom from foreign matter. High quality, well-refined sucrose—from either the beet or cane—is unique in its sparkling, odorless whiteness.

With bagged sugar, don't shake the cloth over open kettles or tanks. If possible buy sugar in paper bags and wipe them carefully before emptying. Store sugar off the floor for free circulation on all sides. Dampness causes lumping, and lumps delay solution in water. What's more, dampness invites the growth of yeast and other micro-organisms. The coarser granulations of sugar may be more nearly free from foreign matter and less susceptible to dampness.

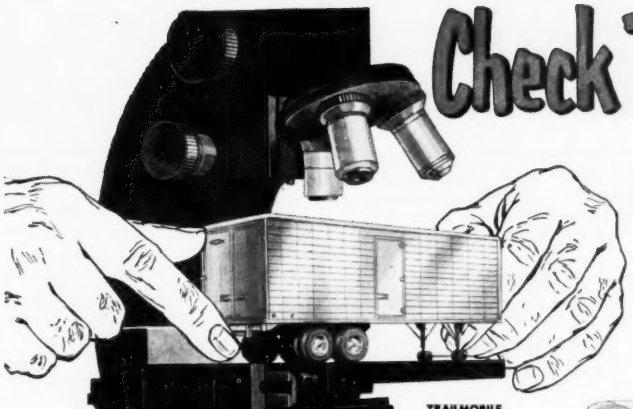
Storing Bags of Sugar

Question—Can you supply us with data on relative humidity to be maintained in a room where paper-bagged sugar is stored? Apparently, low humidity is essential. However, if too low, this condition is not satisfactory for the bags.

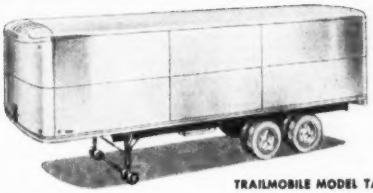
Answer—Bags of sugar should be stored in an air-conditioned room in which the relative humidity is automatically controlled at 65 percent. Temperature should be maintained at 60 deg. F. The room should be heated with circulating warm air, and ample space for circulation must be provided around the bags.

Check Trailmobile

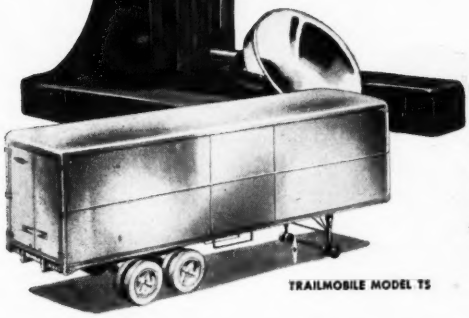
BEFORE YOU SELECT ANY FOOD TRAILER!



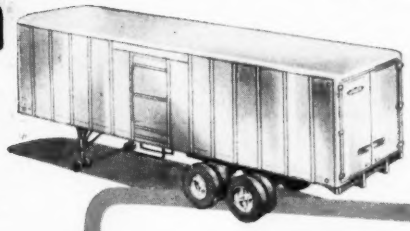
TRAILMOBILE MODEL A



TRAILMOBILE MODEL TA



TRAILMOBILE MODEL TS



TRAILMOBILE MODEL EP

Pick the trailer best suited for your job ...from the *complete* Trailmobile line

What kind of foodstuff do *you* haul? Where do you haul it ... from farm, from warehouse, to retail outlet? Whatever your cargo and destination ... there is a rugged, lightweight Trailmobile model to do it at *lower cost.* No payload stealing dead weight—each Trailmobile delivers maximum payload at minimum operating cost. That's why more and more food men are switching to "load engineered" Trailmobile trailers. Trailmobile puts more *into* each unit ... so that *you* get more *out* of them in service, in earning power—now, and in the years ahead. Your friendly local Trailmobile dealer has all the facts about these better food trailers ... contact him *today.*

TRAILMOBILE
BUILDS THE FINEST TANDEM ON THE HIGHWAY TODAY!

With only two moving parts and two places to lubricate ... this tandem costs less to operate, less to service than any other unit on the road. Tires stay on the road. Stopping is safe, sure, chatterless—road shocks and braking strains are spread over the entire mechanism without shock.

***The Trend is to* TRAILMOBILE**

TRAILMOBILE INC.
Subsidiary of Pullman Incorporated
Cincinnati 9, Ohio • Berkeley 10, Calif.
Friendly Sales and Service from Coast to Coast

8 MORE processing problems solved by Beckman Spectrophotometry!

Now saving time and money in 8 operations, the Beckman Model DU Flame Spectrophotometer with accessories used in this true case history was originally bought for only one job. No other single analytical instrument, with the possible exception of the Beckman Model B Spectrophotometer, is capable of carrying out this highly varied list of uses . . .

1. Rejects Immature Grapefruit
Real Gold Citrus Products rejects immature batches and maintains high quality of grapefruit by determining naringin content. This bitter factor, formerly measured on an inaccurate taste basis to judge immaturity, is now found *accurately* with the Beckman Model DU.

2. Controls Shut-Down Time
Because hesperidin content of orange juice varies seasonally, this company was previously unable to predict shut-down time to remove precipitant coatings from heat-exchanger surfaces. Time is now accurately computed and production control is more precise with Beckman Model DU.

3. Higher Quality—Lower Cost
Controlling Cu and Fe content of sugar syrup to few parts per million prevents reduction of Vitamin C in orange base canning. Real Gold maintains long life of Vitamin C in storage by rejecting all raw materials with excessive Fe-Cu levels. Rapidity of analysis with Beckman Model DU Flame Spectrophotometer speeds production at lower cost.

4. Greater Accuracy
Accurate determination of parathion residue in peel oil with Beckman Model DU insures pure flavoring ingredient. Procedure replaces conventional small-tolerance methods.

5. Maintains USP Standards
AOAC standard method used with Beckman Model DU to control citral quantity on every shipment of lemon oil demonstrates increasing versatility of this precision instrument.

6. Galacturonic Acid Study
High galacturonic acid in citrus is believed to be an indication of degree of ripeness. Fruit maturity controls are now being studied using Beckman Model DU.

7. Storage Controls
Evaluating ageing by color change in juices in storage is now simplified with Beckman Model DU Spectrophotometer and Reflectance Accessory.

8. Determines Soil Needs
Research study is now underway to evaluate orchard soil needs by determining mineral content of ash from juice. Objective—to insure higher quality at growing points.

FOR MORE COMPLETE DETAILS
ASK FOR DATA FILE 33—18

Real Gold Citrus Products, Anaheim, California, obtains speedy production control with Beckman Model DU Flame Spectrophotometer, plus accessories.

these BECKMAN INSTRUMENTS used!

Model DU Flame Spectrophotometer
Providing high resolving power for quantitative determinations of more than 40 elements, the Beckman Model DU Flame gives Real Gold Citrus Products low initial cost and low operating cost (non-technical personnel).

Model DU Reflectance Accessory Set
Because citrus solutions contain too much colloidal foreign matter to allow accuracy with *transmitted* light—the Beckman *Reflectance* Accessory Set gives accuracy for measurements of diffuse reflectance from opaque, colored samples in liquid, powder or solid form.

Complete specifications on this Beckman equipment come to you with Data File offered above. *Write for your copy today!*

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Problem With Black Cider

Question—Last Fall, we constructed a brand new apple juice-and-cider plant with bottling facilities for handling 12,000 gal. daily. Unfortunately, our products did not meet with the consumer acceptance that we had expected. Reason for this was that much of our cider took on a black or greenish-black color. What caused this off-color, and how can it be prevented?

Answer—The condition you refer to is undoubtedly caused by the presence of iron, which reacts with tannin to form a green-black color. It may also occur in bottled cider after opening. In this case, oxidation of low-acid cider takes place and brings about the objectionable discoloration.

We might add that darkening is usually accompanied by flavor deterioration.

The preventive measure is to avoid iron contamination during the manufacture. Carefully wash all soil adhering to the fruit. Also, frequently wash the grater to prevent any iron pick-up.

To reduce the condition, treat with tannin precipitating agents, blend the stock with fresh juice, and referment.

Also we have been advised that darkening is not a problem when the acidity of the cider is above 0.5 percent.

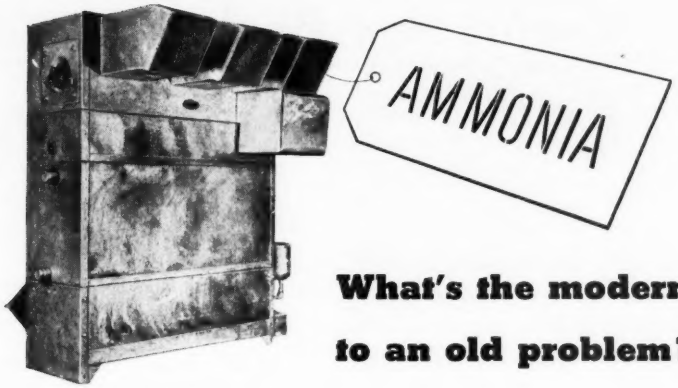
Syrup in Flexible Containers

Question—We are investigating the possibility of exporting sugar syrup (specific gravity, 1.4) in collapsible drums or containers. It is important that such a container should not impart off-flavors or odors to the syrup. Is it possible to obtain a plastic container which, on the outward journey, could be supported by an expendable crate? If so, such crates could be scrapped and the containers emptied, collapsed, and returned in bales.

Answer—To our knowledge, only metal drums are being used for shipping sugar syrup. However, U. S. Rubber Co. manufactures a collapsible rubber drum. We suggest you look into the feasibility of using such a carrier, checking the factors of adaptability and cost.

There is another possibility that might be worth looking into. That is use of a heavy-gage polyethylene bag, which might be inserted inside a multi-wall paper bag. Biggest problem would be the matter of sealing the polyethylene bag so that it could be re-used.

Polyethylene-lined bags have recently been employed for packaging such items as whole, sliced, and French-fry cut potatoes, and also peeled apples.



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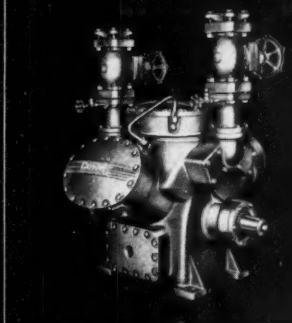

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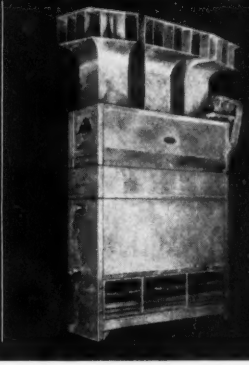

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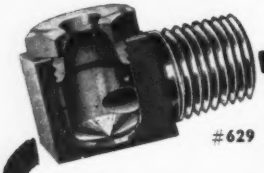

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Rinse Vegetables
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Useful New Books & Government Publications

Canning Team Reports

FOOD CANNING. *A Productivity Team Report. Published by Anglo-American Council on Productivity, 2 Park Ave., N. Y., 1952. 86 pages; 7¼ x 9½ in., paper. Price* $1.06.

This survey affords a revealing glimpse into the overall workings of the U. S. canning industry. Via its pages the individual canner is able to ascertain his own position in relation to the entire field.

Observations range from canning of fruit, vegetables, and fish to the preparation of strained and junior foods, while discussions concern research, control, and varied equipment. Account is taken of administration procedures and chains of command. Cost control and marketing techniques are included.

Of further interest is an analysis of labor-management relations in the industry. Differences of the American worker, as opposed to his British counterpart, are in themselves revealing. Labor turnover, recruitment, training, seniority policy, and the position of trade unions are additional topics.

This well-illustrated volume is one of a series of compilations reporting the findings of a group of British industrial personnel, aimed to raise Britain's productivity.

The program was originated by Paul Hoffman and the late Sir Stafford Cripps.

Enzyme-Study Strides

ADVANCES IN ENZYMOLOGY, VOL. XIII. *Edited by F. F. Nord. Published by Interscience Publishers, Inc., 250 Fifth Ave., N. Y., 1952. 413 pages; 6¼ x 9¼ in., cloth. Price* $8.50.

Here, notable authorities from various parts of the globe further expound on the nature of enzymes. Highly technical, the volume continues series of enzyme studies, along with related subjects of biochemistry.

Included are contributions by H. Holter and Hans H. Ussing, both of Copenhagen, Denmark, who discuss, respectively, "Localization of Enzymes in Cytoplasm" and "Some Aspects of the Application of Tracers in Permeability Studies."

Among the American authors are H. Waelsch, who considers metabolism of glutamine, asparagine, and glutathione. Other aspects are covered by additional U. S. authorities. Also, D. M. Needham, England, and G. Pontecorvo, Scotland, are represented. And one section treats of French evaluations—"La Biosynthese Induite des Enzymes."

Text is enhanced by index divided categorically by author and subject. And there is also a cumulative index of Volumes I-XIII.

New Chemical Dictionary

CHEMICAL TRADE NAMES AND COMMERCIAL SYNONYMS. *By William Haynes. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., N. Y., 1951. 279 pages; 6¼ x 9¼ in., cloth. Price* $5.50.

Up-to-date coverage of more than 20,000 special names used in the chemical industry are presented in this latest technical dictionary.

In addition to providing for identification of modern terms, this text includes the most common alphabetical and numerical abbreviations (such as 2,4,5-T, and N.D.G.A.). Industrial trade names in the food industry, as well as in the textile, automotive, and other fields, are covered also.

The publisher describes this compilation as unique. Top value should be in its use as a tool for those dealing with industrial chemicals.

Guide to Personnel

READINGS IN PERSONNEL ADMINISTRATION. *By Paul Pigors and Charles A. Myers. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., N. Y., 1952. 483 pages; 6¼ x 9¼ in., cloth. Price* $4.50. *(Paper edition* $3.00).

Two professors of M.I.T. have here contributed an excellent text successfully complementing their first volume, *Personnel Administration.*

Comprising a selected collection of many of the best writings of practitioners and social scientists in the field, the work aims at: (1) analysis of personnel problems, (2) defining the role of the foreman, (3) building of work teams, (4) wages and work assignments, and (5) employee services and programs.

Noteworthy is the fact that topics dealing solely with techniques are avoided, since these are in constant flux. Amplified, instead, are thoughts emphasizing the philosophy of personnel administration, its basic prob-

lems and limitations, as well as critical evaluations by union leaders.

Government Publications

SANITARY FOOD SERVICE—INSTRUCTOR'S GUIDE. *U. S. Public Health Service, Publication No.* 90. (*Also issued as Dept. of Navy NAVMED P-1333 and as Dept. of Air Force AFM 146-7.*) *Price* $1.50. Designed for use in training food-service personnel in principles and application of safe food service. Supersedes 1946 *Guide to Safe Food Service*. Includes outline for eight instruction sessions, also more than 100 pages of bibliographic and visual aid material to facilitate teaching of subject.

MECHANICAL PROPERTIES OF METALS AT LOW TEMPERATURES. *U. S. Dept. of Commerce; National Bureau of Standards, Circular* 520. *Issued* 1952, 206 *pages. Price* $1.50. Contains some of latest study results presented at proceedings of NBS semicentennial symposium (1951) on the influence of low temperatures on mechanical properties of metals.

A PORTABLE MECHANICAL LIFT FOR HIGH-PILING AND BREAKING OUT HIGH-PILED BOXES OF APPLES. *Available from Office of Information Services, Production & Marketing Admin., U. S. Dept. of Agriculture.* Describes and illustrates device.

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.

MARKETING INDUSTRIAL MOLASSES. *By B. K. Doyle, Sugar Branch, Production & Marketing Administration, Agriculture Information Bulletin No.* 82. Use of blackstrap molasses in the livestock feed industry can be greatly expanded, according to this survey of the product's marketing possibilities.

COMPOSITION OF FOODS USED IN FAR EASTERN COUNTRIES. *Agriculture Handbook No.* 34, 62 *pages. Price* 30¢. A companion volume to Agriculture Handbook No. 8, *Composition of Foods; Raw, Processed, Prepared,* which gives comparable data for most domestic foods.

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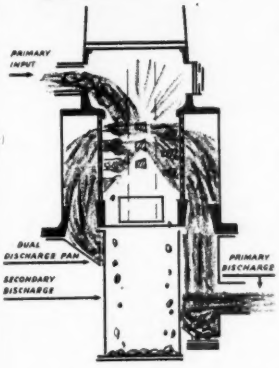

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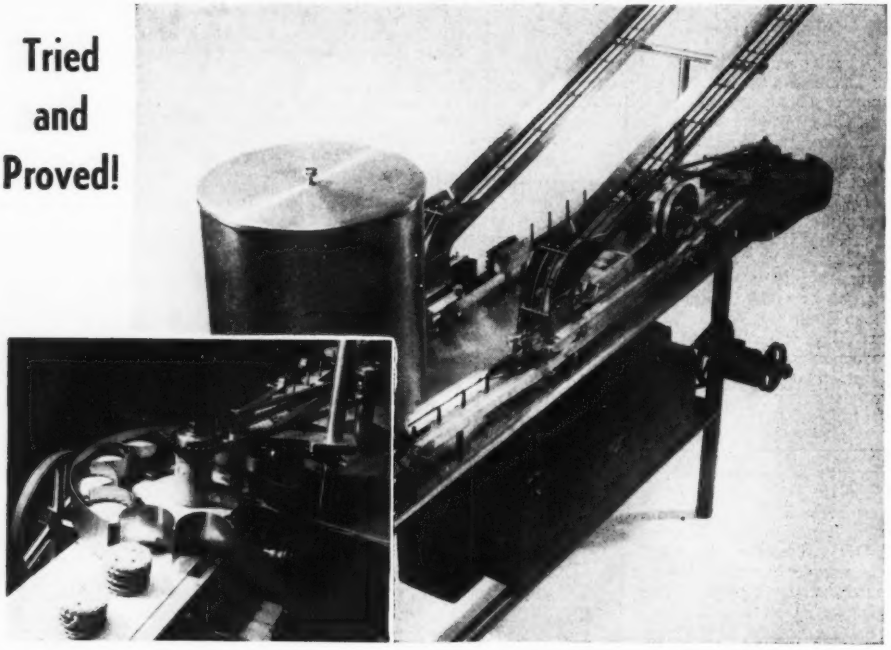

THREE HIGH STACKER . . . Optional device, illustrated above, shows sandwiches being stacked 3 high on a belt conveyor. They may be stacked 2 high and, with certain types of cookies, 4 high. This provides ease of handling to certain types of conveyors.

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*2, 3, 4 or more rows of complete sandwiches stacked on their rims, in metal troughs, to be removed directly from troughs to cartons, or transferred to conveyors.

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Technical News • Washington Highlights • Economic Trends • Labor Developments

Delaney Committee Issues Chemicals-in-Foods Report

Just before Congress adjourned on July 7, the food section of the four-part Delaney Committee report was issued.

► **Recommendation** of the Committee was that the "Food, Drug & Cosmetic Act of 1938 be amended to require that chemicals employed in or on foods be subjected to substantially the same safety requirements as now exist for new drugs and meat products. Adequate provisions for a comprehensive judicial review of administrative decisions should be included in such an amendment."

Five of the seven members of the Committee signed the report.

► **Additional views** were appended to the report by Representatives Miller and McDonough (both of whom signed the report), emphasizing the use of chemicals and estrogenic hormones in foods and the toxicity of pesticides to the general public.

► **Strong minority views** were attached to the report by Representatives Horan and Abernethy. The former reluctantly termed the Committee's report "alarmist" in nature. His views are that Public Health Service, Food & Drug Administration, and Department of Agriculture are responsible agencies doing good work in this field.

Citing failure of the Committee to recognize this fact adequately, Representative Horan concluded: "We need faith in government. We need both a feeling of security and encouragement in the hearts of our producers. We should assure the security of the consumer. Our government is doing that. Let us admit it."

► **Seven chemicals** were discussed in the report, all of which have been ruled out of foods in interstate commerce by F&DA within the last few years. Emulsifiers and hormones were also extensively discussed.

Pesticide residues occupied about 20 percent of the text of the report. Then there was a long section devoted to "The Use of Chemical Emulsifiers to Replace Natural Food Substances in Baked Goods."

► **Another five pages** were devoted to documenting the "inadequacy of present legislation."

In conclusion, the Committee stated: "The increasing use of chemical additives in the production, processing, preservation, and packaging of food has created a serious public-health problem."

Two pages of references to specific pages in the hearings held since Sept. 1950 completed the text of the Committee's report.

Steel Strike Causes Can Shortage

In late July, the steel strike already had denied the industry supplies of tinplate and cans adequate to pack all the crops of tomatoes, peaches, and other perishable foods this year, according to National Canners Association.

To pack the nation's food supply requires approximately 20 billion cans, for which nearly 2.5 million tons of steel is needed.

Corn, tomatoes, and peaches were in greatest jeopardy in late July. About 85 percent of the sweet corn crop, more than 80 percent of the tomato crop, and practically all of the cling peach crop go into cans. The perishables must be handled within a period of five to seven weeks after about August 1. Only about half the cans required can be made and delivered during the short harvest period.

For each day that the strike continued beyond July 21, NCA indicated that the daily loss of canning crops would become increasingly larger. The strike ended July 25, but it took several days to step up output.

Can Problem Eased

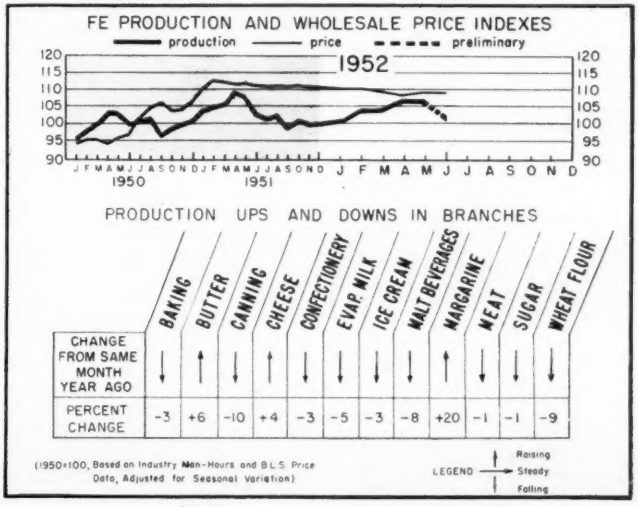
To ease the impact of the steel strike on the food industry, National Production Authority on June 30 directed can manufacturers to give preference to orders from packers of perishables. At the same time its suspended certain can-materials specifications. Direction 4 to can order M-25 permits packers to use any weight of tin coating.

Inventory controls on copper and aluminum also have been lifted temporarily because of the steel strike.

Wins Key Labor Fight

Continental Baking Co. won its fight to save the present system of local-area bargaining with the Bakery & Confectionery Workers' Union, AFL.

National Labor Relations Board turned down the union petition for a company-wide contract for inside



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Tar and asphalt, for example, are effectively defoamed during processing as well as during application by concentrations of Antifoam A as low as 4 parts in 10 million.

Ten ounces of Antifoam A added to a 40,000 gallon batch of crystallizing sodium bromide prevented foaming in that batch and in the next 21 batches as well. Here the effective concentration works out to about 1 part in 10 million.

If cost, contamination, or full use of process equipment are prime considerations in your operations, try Antifoam A. Practically odorless, tasteless and non-toxic, Antifoam A is safe, fast and by far the most economical and versatile defoaming agent on the market.

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1953 Award Competition Announced by FE

Entries in the competition for the 1953 FOOD ENGINEERING AWARD —for achievement in food technology —may be submitted any time in the next few months, FE has announced. The dealine is January 1, 1953, but most entries are expected well ahead of that date. Nominations for the Award may be made by anyone.

Those entering the competition will submit evidence of a character that will enable the Award Jury to evaluate the merits of the process. This evidence will be passed along to the Award Jury by the Editor of FE, who acts as secretary of the Jury. The Jury will be appointed by the Institute of Food Technologists, and its members will be technologists connected with colleges and universities.

The best evidence that can be submitted is a technical description of the process, accompanied by a flow diagram and photographs, and including an explanation of the following:

1. **How the process came to be developed.**
2. **The steps by which it was developed.**
3. **The success, technological and economic, which it has achieved.**

The Award is for an improved or novel process, not for a food product itself. It will go to a food company, not to an individual, its purpose being to encourage food processors to develop or adopt improved processes.

The process must be in commercial use prior to January 1, 1953, and shall have been put to such use subsequent to January 1, 1948.

The Award will be presented at the 1953 annual meeting of the Institute of Food Technologists.

workers covering 60 of 65 cities where Continental has plants.

Behind company and union arguments are some basic facts of bargaining life:

If the union got a company-wide contract with Continental, it could bring tremendous pressure on a nation-wide scale.

The highest wage paid in one locality would become the prize sought for all plants by such a test of economic strength.

And with one company already set up on a nation-wide plan, the union would have a wedge with which to pry the same thing from the rest of the baking industry.

From the company's viewpoint, the area-wide bargaining means that a strike in one locality doesn't shut down its plants throughout the country, thus cutting off all income. Also, when one company is struck, other bakeries in that locality are shut down, thus reducing the economic pressure on any one plant.

MRO Liberalized

CMP Reg. 5, which governs procurements of maintenance, repair, and operation (MRO) supplies, was amended June 25, as follows:

The $1,000 limitation on cost or quantity of materials used for a single installation project is removed. However, the quarterly restriction on expenditures for installations is retained.

Installation now is defined to include any setting up or relocation of machinery and fixtures which does not occur in conjunction with a construction project.

"Minor capital addition" is redefined to make it clear that all items purchased as part of a single project constitute one addition.

Like Ice Cream Sweet

That consumers prefer high-sugar ice creams is clearly indicated by recent tests, Flavoring Extract Manufacturers' Assn. of the U. S. reports.

Given two vanilla-flavored samples with 11 percent sugar and two with 17 percent, 70 percent of the 271 consumers on the taste panel ranked the high-sugar ice creams as their first choice.

Strength of vanilla flavor had little effect upon the choices.

Pillsbury vs. FTC

"Without basis" and "unrealistic" is how Pillsbury Mills, Inc., answered the FTC charge that purchase of Ballard & Ballard created a monopoly.

Spelling it out in more detail, Pillsbury said:

"The Government apparently has singled out this case from a large number of similar acquisitions as a test case for the 1951 Clayton Amendment. If the Government has any real basis for the claim, action would have been taken over a year ago when Pillsbury went to the FTC with full information about the proposed acquisition of Ballard & Ballard. The Government took no action, and has waited for more than a year, during which time integration with Ballard & Ballard has been completed.

"It is obvious to anyone who knows

the facts that we have no monopoly, nor any approach to a monopoly. No one in the food business has a monopoly, and particularly no one in the flour milling business has anywhere near, or ever will have, a monopoly.

"The prime purpose of these acquisitions was to obtain plant and equipment necessary to provide the extra service demanded by Pillsbury customers. And we are certain Congress never intended to prevent the right of any American firm to acquire additional facilities for supplying the needs of its customers."

Meat-Car Innovation

First shipment of its fresh meats in a mechanically refrigerated car has been made by John Morrell & Co. over a 2,000-mile run between its Sioux City and Miami branches. Perishable meats heretofore have been transported in cars refrigerated with

(Turn page)

Hors d'Oeuvres

• Births hit a new high last year—3,900,000. Might say it was a year of great expectancy for baby food manufacturers.

• *Hitting an 18.7-gal. peak in 1945, per capita beer consumption slumped to 17.1 gal. last year. Reason was too many babies, which upset consumer-age ratios. But the brewers will get 'em yet.*

• Working safely with atomic radiation today is said to be a matter of common sense and awareness. That's what worries us.

• *Increased use of processed foods is saving 2 hr. per day per homemaker—leaving wives an extra 120 min. of daily leisure in which to spend beyond their budgets.*

• Normal diet, containing 26 percent protein, reduced the incidence of cancer in rats, Alabama Polytechnic Institute reports. If the wife doesn't serve enough steak, here's a point that might win her over.

• *Want to crack a tough nut without smashing a finger? According to U. S. Patent 2,601,421, the answer is to apply high-frequency dielectric heat to vaporize moisture inside the nut and explode the shell. And why not? Heat disgorges the innards of popping corn.*

• Fishermen married to fish-hating wives have a new lease on domestic life. Addition of chlorophyll to a waterless hand cleaner removes fish odor. Fine for Izaac Waltons. But a deodorant for old sea dogs? They'd see you in Davey Jone's locker first!

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Proceedings of the United States Technical Conference on Air Pollution. A systematic presentation of useful information on air pollution; its effect on human, plant, and animal life; the measures being taken to control it; and the legal and administrative problems which are being overcome connected with pollution prevention and control. Contains detailed analyses of different contaminants; describes latest equipment used, etc. **Sponsored by the Interdept. Comm. on Air Pollution. Chairman: Louis C. McCabe, Chief, Office of Air and Stream Pollution. 847 pages, $12.50**

SANITATION for the FOOD PRESERVATION INDUSTRIES

Presents workable principles and methods of good plant sanitation. Gives "how-to-do-it" material of value to all food processors, and particularly useful to the canning, freezing and dehydration industries. There is also much to help those concerned with sanitary transportation, storage and distribution of both fresh and processed foods. Here are helpful illustrations, all the essential steps, equipment, applications, etc. **Prepared by The Association of Food Industry Sanitarians, Incorporated, in cooperation with The National Canners Assoc. 284 pages, 118 illustrations, $5.00**

INDUSTRIAL WASTE TREATMENT

Just Out!

A practical guide to the problem of dealing with industrial wastes. Covers the important legal aspects of stream pollution, tells how to secure samples and data, and how to develop and test a method of treatment. Discusses factors of plant design and construction to minimize pollution, and the techniques of reclaiming byproducts from industrial wastes. **By E. B. Besselievre, Chief Sanitary Eng., Foreign Div., The Dorr Co. 365 pp., 100 illus., $7.00**

HOW TO RUN A SMALL BUSINESS

Your business will have a better chance to flourish, promises this great new business guide by J. K. Lasser, if simple rules are followed. It shows how to buy, sell, manufacture, operate, control . . . handle all parts of your business better. An amazing list of do's and dont's —ideas, methods, pointers to help the small businessman build business —plug every loophole for escaping profits. **By J. K. Lasser, C.P.A.; Adjunct Professor of Taxation, N. Y. U. 350 pp. $4.95**

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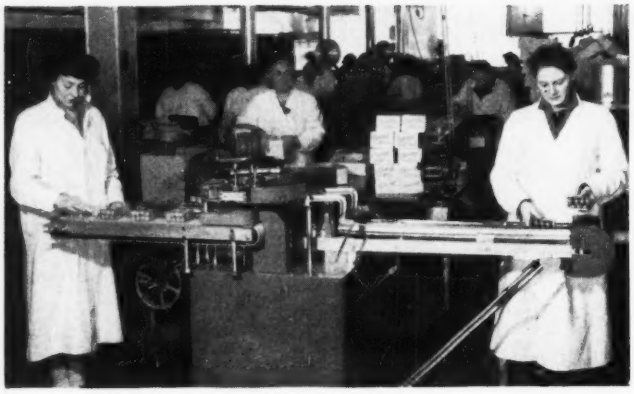
This offer applies to U. S. only



Unique Wrapper Is Versatile

This Flexible machine at Boston Sausage & Provision Co. wraps 1-lb. packages of 1-lb. franks, 3,080 per minute. Through use of change parts, unit can wrap round, square, rectangular, or irregular-shaped products. It can also be rapidly changed to handle different size packages, using a variety of heat-sealable films. Wrap-King Corp., W. Springfield, Mass., developed the machine.

ice-filled bunkers, which frequently have to be reiced.

With automatic controls set at 34 deg. F., cargo temperatures did not vary more than 2 deg., despite outside temperatures as high as 100 deg. F. Hauled in this first shipment was a 26,000-lb. load of fresh beef, pork, lamb, bacon, ham, and canned meats.

Known as a Thermo-King car, the new reefer is the first of 25 to be equipped with self-contained, refrigerating-heating units manufactured by Thermo-King Railway Corp., Minneapolis. Cars are built by Mather Stock Car Co., Chicago.

Fast Infestation Test

A quick and simple aid in determining hidden infestation of wheat has been developed by Albert C. Apt, a U. S. Department of Agriculture entomologist at the Manhattan, Kan., laboratory. The test reveals the percentage of insect-damaged wheat within a few minutes.

Here's how it works: A 100 g. sample of wheat is placed in a flat-bottom pan 7 in. wide and 3 in. deep. A pint of a 2-percent solution of ferric nitrate in water is poured over the wheat. (Ferric nitrate causes the damaged kernels to float.) After the contents are swirled in the pan for 30 sec., the floating, insect-damaged kernels are lifted out of the pan onto a piece of blotting paper, where they can be counted easily.

A gallon of the solution costs less than 50¢. And the liquid may be strained through a piece of cheese cloth and used repeatedly.

6 Ways to Sweeter Corn

Fresh sweet corn can be delivered to the market sweeter, with better texture, and in condition to stay that way longer. It can, that is, if new recommendations by the U. S. Department of Agriculture are followed. To be used singly or in combination, the procedures advised are:

1. Precool corn immediately after picking to 40 deg. F.
2. Precool corn before crating.
3. Use the smaller of two standard crates.
4. Put crates into cars on criss-cross plan for better air circulation.
5. Use cars with fan ventilation.
6. Top-ice cars as heavily as possible.

All of these recommendations accent better refrigeration, which helps to keep sweet corn from deteriorating into starchy corn.

Chemical Keeps Fruit

Spoilage of fresh fruits and vegetables is said to be prevented by an inexpensive chemical treatment developed at Purdue University. Although the treatment is supplemental to refrigeration, fragile fruits, such as strawberries, kept for five days without ice following a 24-hr. exposure to a small quantity of the spoilage inhibitor.

Apples and plums also reacted fa-

vorably, and the treatment is being considered for potatoes and tomatoes.

Costing less than 1¢ a bushel, the treatment employs volatile chlorinated hydrocarbons.

Frozen OJ Improved

Separation in frozen orange juice concentrate has been eliminated by General Foods Corp. Now Birds Eye orange juice can be reconstituted and kept in the refrigerator as long as 72 hr. without separating into a layer of more solid material at the bottom and a watery layer at the top.

Separation is caused by enzymic action in the juice, and if this action is permitted to continue, it will deteriorate the taste and vitamin content of the product. So inactivation of enzymes apparently is achieved. This could be done in a continuous short-time high-temperature heat exchanger.

On Non-Stop Mixing

Continuous mixing has now been successfully adapted to the making of mayonnaise and the drying of egg albumin, according to E. T. Oakes, of E. T. Oakes Corp., Islip, N. Y.

It is reported that one large producer is already turning out mayonnaise at 7,500 lb. per hour with continuous mixers using far less equipment than before and reputedly producing a finer product.

With the mixing carried out in a close system, inert gas is substituted for air, with less tendency for the product to turn rancid. Dollar savings in this case are reported to be $25,000 per year per machine.

The other adaption—drying of egg albumin—is effected by first forming a light foam in the mixer, then drying the foam. This process is stated to permit faster drying at lower temperatures, making for a finer-textured product.

Really Clean? Rays Tell

Just how good is your plant-sanitation program? Are you using the most effective cleanup technics and procedures? And which corners need more attention?

These questions may soon be scientifically answered by using dirt and bacteria that have been made radioactive.

In the plan that Dr. G. M. Ridenour, of the National Sanitation Foundation, is developing at the U. of Michigan, measured quantities of these specially prepared "undesirables" will be placed

Morningstar

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More and more Food Product Processors from coast to coast are depending upon MORNINGSTAR for Food Starches and Thickening Agents. Direct importers and manufacturers, MNI can ship quickly and economically in any quantities from a few 100 pound paper bags to many carloads. MORNINGSTAR BRAND Products are scientifically prepared and laboratory controlled to precise standards of *uniform* fine quality. They'll add new texture and appeal to many foods.

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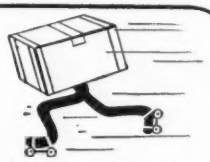
Put your PACKAGES on ROLLER SKATES with Standard Conveyors



Whatever you have to handle — packages, units, cartons, castings, assemblies — you can keep them rolling — faster — at lower cost with conveyors.

Whatever you need in conveyors — a complete engineered system, a portable, self-contained conveyor unit — Standard is known as headquarters for conveyors — gravity and power, roller, belt, slat, push-bar — spiral chutes — pneumatic tube systems.

Write telling us what you make or handle. We will send literature showing Standard Conveyors at work in your kind of business. Address Dept. **FE-82.**

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For more information, use post card on last page.

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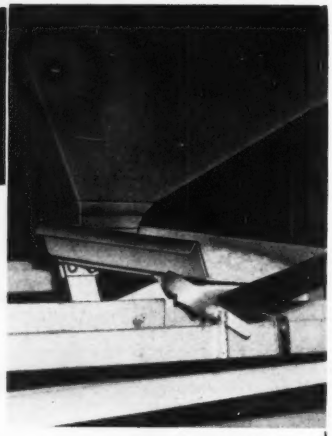

Syntron Vibratory Feeders provide an efficient, economical method of conveying bulk foods and the simplest and easiest means of controlling the rate of flow.

All along your food production line materials can be made to flow as desired—your processing plant need never be starved or overfed—with Syntron Feeders your feed rate can be varied to provide a flow of bulk foods to suit your needs.

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For FREE Catalog
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SYNTRON
VIBRATORY
FEEDERS

SYNTRON COMPANY
460 Lexington Avenue Homer City, Penna.

on equipment and in areas to be cleaned. Then pre-cleaning X-ray films will be made wherein radioactive quality of the dirt will reveal both its quantity and distribution at the points checked.

After cleaning, representative surfaces again will be exposed on X-ray film. And the "before and after" comparisons will indicate efficiency of the plant cleanup technic.

Million-$ Mellon Cut

About a million dollars a year could be saved by loading crates of cantaloupes on end in railroad cars, instead of the usual lengthwise loading. That is the conclusion of studies by the U. S. Department of Agriculture.

Breakage in transit of cars loaded on end is approximately one-third the breakage in lengthwise loads. What's more, spoilage is reduced, refrigeration costs cut, and loading of railroad cars speeded.

A modified clamp truck is recommended for loading cars. This permits four crates on end (two high and two wide) to be trucked into the car and placed directly into position in the load.

heart of the strainer

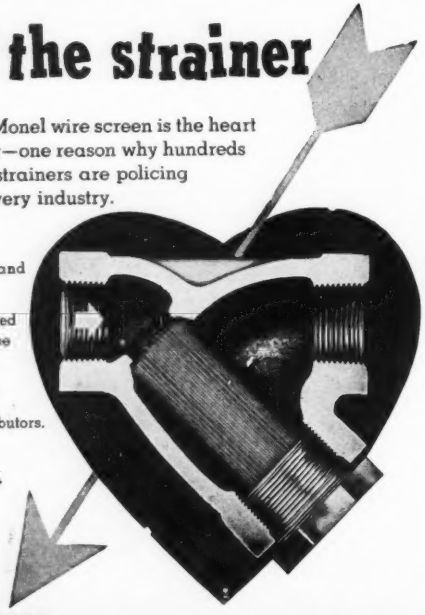
A high-grade, woven Monel wire screen is the heart of the Yarway Strainer—one reason why hundreds of thousands of these strainers are policing pipe lines in nearly every industry.

OTHER REASONS—

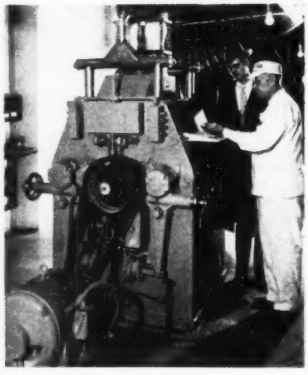
- cadmium plated bodies and screen caps
- straight threads, machined faces and spark-plug-type gaskets on screen caps
- ten sizes from ¼" to 3"

Sold by 216 industrial distributors.
Write for Bulletin S-203.

YARNALL-WARING CO.
127 Mermaid Ave.
Philadelphia 18, Pa.



YARWAY STRAINERS



Miller Goes Automatic

Major benefits have been attained at Centennial Crown Mills, Portland, Ore., by installing a practically automatic, pneumatic-set roller mill. The plant's older equipment required the attention of an attendant and frequent servicing. The new mill saves these man-hours and down-time. Yet the grind is better because the feed is uniform and roll pressure is held constant by a control valve.

Tight machine construction and smooth design ease plant sanitation. And safety is increased by a compact drive, which also reduces maintenance. Allis-Chalmers developed the mill (see p. 83 July '51 FE).

Really "sealed-in" flavors that defy time are the result of the remarkable new SEALVA process. Each droplet of flavor oil is completely sealed from the atmosphere with an edible protective film. Yet SEALVA powdered flavors are readily soluble in water.

Until the development of SEALVA, there has never been a wholly successful method of overcoming volatility and oxidation of flavor from powdered foods, tablets, etc.

SEALVA flavors are the answer. They will retain strength, quality and freshness throughout the shelf-life required for packaged products.

SEALVA flavors can be supplied in the following flavors and the list is growing daily: *Strawberry, Raspberry, Cherry, Orange, Lemon, Lime, Peppermint.*

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Another Detecto-Gram Scale for your precision weighing jobs. Use this Detecto-Gram Super Sensitive Model #74-02 where hair-line accuracy is essential, where an error in the smallest fraction of an ounce may affect your profit.

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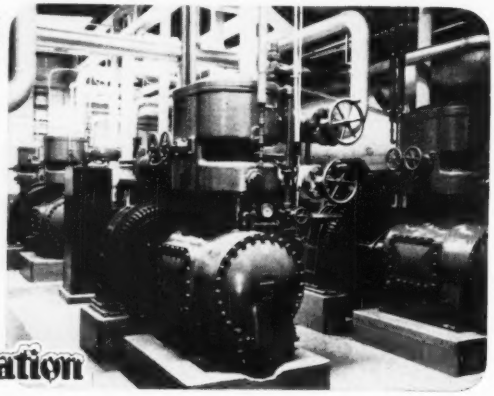
SCALE ENGINEERS IN ALL PRINCIPAL CITIES

Four of Seven Frick Ammonia Booster Compressors in Service at the Fairmont Canning Plant, Fairmont, Minn.



FRICK Refrigeration

Serves Fairmont Canning Company

This famous Minnesota producer of frozen food uses eleven large Frick booster compressors, and six Frick second-stage machines, in its various plants, for maintaining low temperatures with economy and dependability.

The really important jobs – whether air conditioning, ice making, food freezing or other cooling work – call for Frick Refrigeration.

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA. U.S.A.

Improving Food Quality

Preservatives and antioxidants for use in foods will be developed and tested in food section of new 16,480-sq. ft. laboratory erected at Kingsport, Tenn., by Tennessee Eastman Co. Several types of foods—ranging from fats and oils to spices—currently are undergoing tests, as are packaging materials. In department shown above, all types of foods are prepared, and commercial products are tested and analyzed by an experienced taste panel.

Why Puree Discolors

It appears probable that discoloration of glass-packed pureed foods is an oxidizing effect catalyzed by small traces of iron. This is the tentative conclusion of specialists on the H. J. Heinz Co. fellowship at Mellon Institute, Pittsburgh.

It is believed that the oxygen needed for this reaction is derived in part from occluded air or air leakage through imperfect closures.

With improvement in gaskets, it is reasoned that the discoloration can be avoided.

Tagged Sugar

Sugars and sugar derivatives having radioactive carbon atoms located in specific positions within the molecule have been prepared by the National Bureau of Standards for the first time in good yield and high activity.

Identical with ordinary sugars except for the radioactive atom of carbon 14, these sugars are seen as an aid to researchers in biology, bacteriology, chemistry, and medicine, enabling them to trace a single carbon atom through an entire series of complex chemical reactions.

Availability of these materials

PLAN TOMORROW'S CHARGING ROOM TODAY!

This free 20-page booklet showing efficient, charging room layouts is just what you need to put system into your battery charging operations. It's the latest addition to the vast fund of technical information available to you under the Gould Plus-Performance Plan. Shows how cranes, hoists, battery stands, charging equipment and stations can be located in any size room for maximum efficiency, handling speed and safety. You'll need it tomorrow . . . so send for it TODAY.

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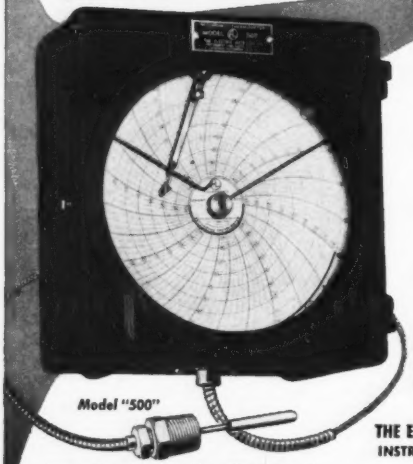
AUTO-LITE

...for TEMPERATURE RECORDING



★ This low-cost protection gives permanent proof of temperature behavior.

★ Various standard chart ranges from minus 40°F. to plus 550°F.

★ 3 standard types; choice of 24-hr. or 7-day cycle.

Send for new catalog G-143-B, describing many styles of Auto-Lite temperature indicators and recorders.

Temperature Recorder with capillary tubing for EYE-LEVEL reading. Priced from $42.50.

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should thus provide the key to such problems as the role of lactose in nutrition, the mechanisms by which bacterial cellulose is produced from sugars, and the action of enzymes in living organisms.

Development of practicable procedures for synthesizing the sugars is the result of a broad program on radioactive carbohydrates now being conducted by Dr. H. S. Isbell and associates of the NBS staff under the sponsorship of the Atomic Energy Commission.

The utility of carbon 14 as a tracer is due in large part to the ease in which it can be detected in small concentrations, and the fact that its chemical behavior does not differ in any important way from ordinary carbon.

Modified Milk-Fat Test

Development of a modified test for determining the fat content of milk and cream has been announced by dairy chemists of the USDA.

In this method a detergent-type reagent is substituted for sulfuric acid in the long-established Babcock test. And accurate and rapid results are reported.

As in the older method when the reagent is added to milk, the proteins break down, causing the fat-water emulsion to be destroyed and the fat to rise to the neck of the test bottle.

It is stated that the method permits clearer and more precise readings and allows for easier cleaning of the test bottles, with simplification by omission of the corrosive sulfuric acid.

F&DA Food Standards

In early July, Food & Drug Administration's ice cream hearing was in recess, with July 16 set as the date for resuming testimony on surface-active agents.

Final orders were still awaited on frozen fruits and canned mushrooms, and tentative orders are awaited on residue tolerances and canned pineapple and canned pineapple juice.

District headquarters, sub-districts,

and inspection stations are listed with addresses on page 5972 of the July 2 *Federal Register*, to bring up to date the official printing of F&DA's organization.

USDA Grade Standards

Recent actions by Production & Marketing Administration, U. S. Department of Agriculture, on U. S. Grade Standards and related activities include the following:

Check List of USDA Standards for Farm Products, 14 pages, processed, revised to Apr. 1, 1952; lists both mandatory standards and permissive and tentative standards.

Persian (Tahiti) limes, revised, proposed, page 5467, June 18 *Federal Register*, written comments received until July 18.

Canned sweet cherries, third revision, proposed, deadline for written comments extended from May 29 to Nov. 1, page 5469, June 18 *Federal Register* (proposed revision appeared on page 3796, Apr. 29 *Federal Register*).

Winter pears, revised, page 5633, June 24 *Federal Register*, effective July 24.

Table grapes (European or vinifera type), revised, page 5793, June 28 *Federal Register*, effective July 8 (10 days after publication instead of the usual 30 days, because packing season had already commenced, and for other reasons.

Cottonseed for crushing, revised, proposed, page 5955, July 2 *Federal Register*, written comments received until July 22 ("It is proposed to make amendment effective by Aug. 1952.")

Florida grapefruit, new, proposed, page 5995, July 3 *Federal Register*, written comments received until Aug. 2 (existing standard covers both Florida and Texas grapefruit; new standard, if adopted, would delete all references to Florida under existing standard).

Dried currants, revised, proposed, page 5998, July 3 *Federal Register*, written comments received until Aug. 2.

Fruit preserves (or jams), second revision, proposed, page 5999, July 3 *Federal Register*, written comments received until Aug. 2.

Edible sugar cane molasses, revised, page 6181, July 10 *Federal Register*, effective Aug. 9 (revision first proposed in Sept. 26, 1950, *Federal Register*, and further revision proposed in May 17, 1951 *Federal Register*).

Peaches, revised, page 4473, May 16 *Federal Register*, effective June 15.

Processed raisins, typographical error corrected, page 4477, May 16 *Federal Register*.

Apples Given Chemical Bath Economically

● Prepared pie apples must be chemically treated to retain that "just sliced whiteness" until they reach the baker. Many processors find that a Cyclone Stainless Steel Conveyor Belt is a very economical way to carry apples from the slicing machines through the chemical bath and on to the packing tables. Steady flow of slices to containers is established.

There are "bottlenecks" in many food plants that can be eliminated with the installation of the "right" Cyclone Conveyor Belt. Our experienced engineers will be glad to assist you in deciding which of our 3 types — Flat Wire, Flex-Grid or Spiral Woven—will best serve you. Write Dept. H-82 for our free catalog No. 4.

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UNITED STATES STEEL COMPANY, WAUKEGAN, ILL.
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UNITED STATES STEEL

SEALTITE *SYNCHROMATIC*

- Uses any standard gusseted paper bag.
- Fills, settles and seals 30 to 50 bags per minute.
- Delivers a square, flat-topped sift-proof package.
- Cost reductions up to $500 per month per machine reported by users.

Write for information

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BUFFALO 13, NEW YORK

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Get the most out of your Spraying Equipment with minimum power . . . with efficient spraying.

Use Yarway Nozzles. No internal vanes or other restrictions to clog or hinder flow. Two types—Yarway Involute-type producing a fine hollow spray with minimum energy loss, and Yarway Fan-type producing a flat fan-shaped spray with time-saving slicing action for cleaning.

Wide range of standard sizes and capacities. Cast or machined from solid bar stock.

Thousands in use. Write for Bulletin N-616.

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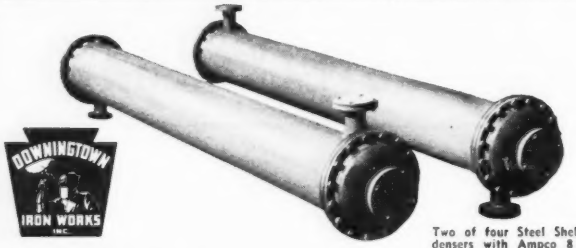

Two of four Steel Shell Condensers with Ampco 8 Heads and Tube Sheets. These condensers were built for export to the Middle East.

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. . . yes, DOWNINGTOWN solicits your inquiry for Heat Transfer Equipment fabricated of Aluminum, Inconel, Nickel, Phosphor and Aluminum Bronze, Copper, Stainless, Monel, Silicon Bronze and various grades of Carbon Steel.

Design and construction will meet requirements of A.S.M.E. Code or other agency specified by customer. Equipment of our design is sold on a guaranteed performance basis or we will fabricate to customer's drawings. Modern facilities available for radiographing, stress relieving and heat treating, where required. Remember: "Your Needs are Our Specialty!"

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Write on your letterhead for DOWNINGTOWN literature on shell and tube heat exchangers.

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STEEL & ALLOY PLATE FABRICATION
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NEW YORK OFFICE: 30 CHURCH STREET

Schedule of Events

August

12–14—Western Packaging & Materials Handling Exposition; Shrine Convention Hall, Los Angeles.

September

4– 5—Dairy Industry Conference; Statler Hall, Cornell U., Ithaca, N. Y.

8–12—National Instrument Conference & Exhibit; Cleveland.

9–10—American Soybean Assn., 32nd annual convention; Purdue U., Lafayette, Ind.

9–13—National Chemical Exposition, 6th annual; Coliseum, Chicago.

21–24—International Assn. of Ice Cream Manufacturers, annual convention; Conrad Hilton Hotel, Chicago.

22–27—Annual Dairy Industries Exposition; Navy Pier, Chicago.

24–26—Milk Industry Foundation, annual convention; Sherman Hotel, Chicago.

October

3– 7—American Meat Institute, annual convention; Palmer House, Chicago.

14–16—Society of Industrial Packaging & Materials Handling Engineers, annual exposition; Coliseum, Chicago.

22–25—National Bakery Suppliers Assn., annual convention; Drake Hotel, Chicago.

Frozen mixed vegetables, new, proposed, page 4576, May 20 *Federal Register*, written comments received until June 19.

Canned cream style corn, revised, proposed, page 4767, May 24 *Federal Register*, written comments received until June 23.

Canned whole kernel (or whole grain) corn, revised, proposed, page 4769, May 24 *Federal Register*, written comments received until June 23.

Frozen whole kernel (or whole grain) corn, third revision, proposed, page 4770, May 24 *Federal Register*, written comments received until June 23.

Milled rice, revised, page 4842, May 28 *Federal Register*, effective May 28.

Shell eggs, revised, page 5303, June 11 *Federal Register*, effective July 1.

—*End*—

Nickel and Alloys

—*Continued from page 81*

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of the substance being heated, or of the heating medium, which cling to the metal wall, as well as the resistance of the metal wall itself. Where the heat transfer resistance of the film of product or of heating medium is high, then the resistance of the metal itself may be relatively unimportant and the choice of metal will not have much effect upon the overall heat transfer rate.

Doesn't Your Business DESERVE the BEST in Sanitizing Agents?

The ORIGINAL Quaternary Ammonium Germicide

Laboratory tested and controlled 243189R This Control No. Guarantees POTENCY UNIFORMITY QUALITY

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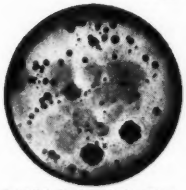
SANITIZING AGENT

to do a more effective sanitizing job throughout your plant!



Petri dish showing colonies of bacteria before the use of ROCCAL.

Petri dish showing no bacterial growth after the use of ROCCAL.

In the Food Industry, the importance of using only the best in sanitizing methods cannot be over-emphasized.

In Roccal, the *original* quaternary ammonium germicide, the food industry is offered a sanitizing agent that is laboratory controlled and tested. The uniform quality of Roccal means uniformly good results in doing a proper sanitizing job.

Roccal is a powerful germicide. In recommended dilutions, it is non-poisonous, non-irritating to the skin, virtually odorless and tasteless.

Roccal can be used for every sanitizing job in processing and packaging in the following food industries: milk, cream, ice cream, butter, cheese, egg breaking, sugar, fish, poultry, fresh frozen vegetables and fruits, meat products, cereal products, candy and beverage, wherever the product comes in contact with equipment. Also to keep walls and floors sanitary.

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Do you have a production problem on stocks you grind, to get desired uniformity or fineness? Are you looking for increased output with a cost reducing method? Profit by Schutz-O'Neill's experience of almost 60 years in the rapid, dustless, accurate pulverizing of any dry, non-gritty, grindable stock. Your acceptance of this offer for a test grind does not obligate you. Schutz-O'Neill pulverizers are made in 6 sizes with capacities up to 3000 lbs. per hour.

Catch tramp iron or steel

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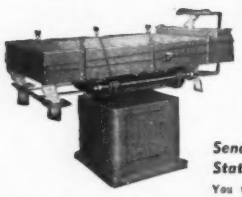
Standard equipment on feeders for Schutz-O'Neill Pulverizers.



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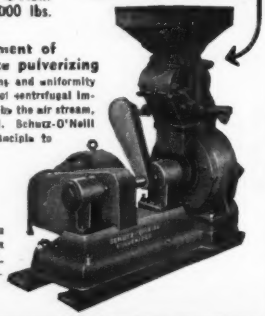

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Such a condition would exist where solid films of corrosion product, scale, or baked on substances have collected on one or both sides of the metal wall.

However, in several common types of food processing equipment, including cooking kettles with steam jackets or internal steam coils, steam heated tubular evaporators, and continuous multi-tubular coolers, the thermal conductivity of the metal wall used for heat transfer can be of significant importance. The thermal resistances of films of condensing steam on one side and of boiling liquids on the other side of the wall are usually comparatively low so that it is advantageous to keep the thermal resistance of the wall as low as possible.

In continuous multi-tubular heating and cooling equipment, the relatively high liquid velocities that are frequently used favor good film heat transfer, and here again the thermal conductivity of the metal can significantly affect the overall rate of heat transfer obtained from the equipment.

In reference to Table III, it will be noted that nickel has relatively high thermal conductivity and is superior to Monel, Inconel, and the stainless steels in this respect. This, combined with its useful corrosion resistance, has resulted in the use of nickel for the construction of numerous types of heat transfer equipment employed in the processing of many different food products.

Data from tests are given in Table IV. From these data were calculated the overall rates of heat transfer during both the heating period and boiling period. These rates are given in the last two columns.

Differences in heating area and steam pressure with the various kettles are taken care of in the calculation of overall rates. Since differences in thickness of the kettle walls are not taken care of in this manner, it is advisable to compare runs made with approximately the same metal thicknesses. Grouping of this sort has been made in Table V, so that the effect of metal thickness on the heat transfer rate can be noted.

Tomato Processing

The results of tests made on tomato processing equipment are shown in the three graphs at the beginning of this article. From the standpoint of corrosion, conditions seem to be most severe in the tomato juice surge tank. That corrosion was less here than in the filler bowl at higher temperature was probably due to the lower dissolved air content of the juice in the filler bowl.

It will be noted that Monel was more resistant than nickel to corrosion by the hot juice. With the difference in density taken into account, Monel would be more durable than aluminum which, of the metals covered by the graph, showed least weight loss.

In the catsup plant the most severe corrosion conditions seemed to be in the scalding tank, and the least in the catsup boiling tank. There was probably more aeration in the scalding tank to account for the greater amount of corrosion there as compared with the catsup boiling tank. Monel and nickel provided the best all-round resistance to corrosion, with Monel having the advantage in all cases.

From the data on corrosion rates determined by the tests, and from the known relationships between the area of metal exposed in each piece of equipment and the volume of product handled per hour, it has been possible to calculate the possible metal pick-up it all equipment, including all tanks, piping, etc., were to be fabricated from the same material.

Such calculations for Monel and nickel indicate that the possible pick-up from Monel in a typical juice plant would be only 2 ppm. and from nickel only 11 ppm.

Both these concentrations would be well below any amount having an effect on the quality of the product. Similarly, in a catsup plant fabricated from Monel, the metal pick-up would be only 2.4 ppm. and from nickel only 4.4 ppm. Individual pieces of equipment would, of course, add even less metal to the products.

Consequently, either nickel or Monel can be used with the assurance that their high resistance to corrosion, as demonstrated by these tests, will provide durable equipment that will protect the quality of the products handled.

End (Resume reading on page 82)

Dehydrated Potatoes

—Continued from page 91

ranging from about 0.08 to 0.42 mm. The inside of the cell is composed of various compounds, including starch cells and water. These substances are held within the cell by a layer composed of long cellulose fibers and other materials which are woven together into a wall.

If this wall is broken, the intracellular substances are no longer retained within the main mass of the cell. This release of intracellular material from the cell results in the undesirable pasty and gluey consistency.

Our three photomicrographs (on p. 91) illustrate the potato cell, show what rupture is, and indicate how the rupture can take place. They were prepared by dispersing a few rehydrated cells on a standard glasss microscope slide and placing a second standard slide on top—so that the cells were sandwiched between the two.

Simulated With Forceps

Fig. 1 shows cells of typical size and shape. Cell (A) is of about 0.10 to 0.13 mm. dia. In order to artificially rupture these cells, pressure was applied to the top plate by a pair of forceps held in the hand. Fig. 2 shows the cells under maximum pressure. And in Fig. 3, the pressure has been released.

As pressure was increased, the cells tended to swell or flatten out like partially inflated balloons. Cell (B) was the first to break. It was also noted that increasing amounts of the intracellular material flowed out as pressure was increased. Observations of the other cells revealed a similar action.

The cells shown in Fig. 1 are those of mashed potatoes as we like to eat them, whereas those in Fig. 3 are ruptured, resulting in the pasty, nonpalatable food stuff.

In order to demonstrate the relationship between consistency of the rehydrated granules and the percent of cells which are ruptured in any given sample, the consistency curve (bottom, p. 91) was plotted.

True, it was realized that factors other than viscosity are to be considered in consistency—such as smoothness, rigidity, and stickiness. However, the factor of viscosity was the easiest to measure. And it was assumed that it would show the trend of consistency characteristics.

From the plotted curve it is seen that the percent of ruptured cells is an index to consistency. Data for this curve were obtained by mixing dehydrated cells of 100 percent rupture with cells of 0 percent rupture in the desired weight ratios. Ten grams of this prepared sample were rehydrated with an excess of water (200g.), held on a steam bath for 30 min., and cooled to 20 deg. C. (68 deg. F.).

Viscosity measurements were made with the Stormer Viscosimeter. The viscosity values varied considerably between different samples, but all indicated the same trend.

It is believed that the pictures and the viscosity curve more clearly define the reason for a pasty potato granule product. They serve to show what cell rupture actually is, thus giving basic aid toward improvement of the product.

End (Resume reading on page 92)

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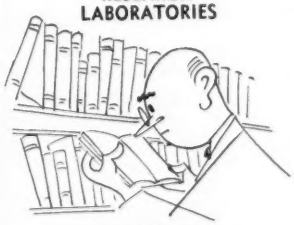

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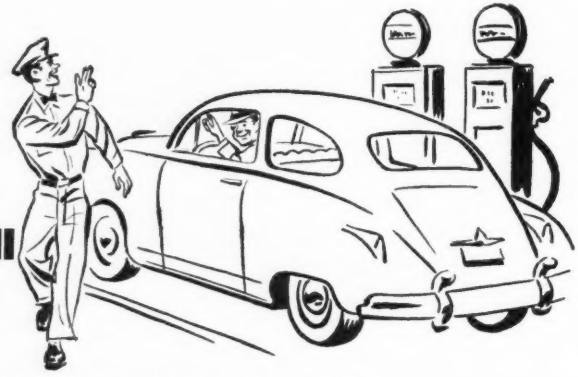
"SEE YOU AT THE POLLS!"

"SEE YOU AT THE POLLS!"

"SEE YOU AT THE POLLS!"



Nobody knows for sure how it started—this line about "See you at the Polls!" we're hearing all over these days.

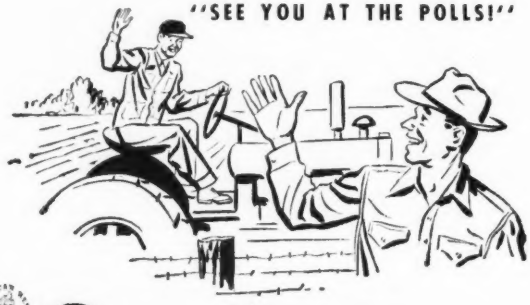
Best explanation seems to be that it came from that state candidate out west. . . . His opponent in a debate got all riled up and challenged him to fight it out in the alley.

But he said—"I'll settle this the AMERICAN way—I'll see you at the polls!" And the audience picked up the chant.

Now everybody's saying it—and on Nov. 4 everybody will be *doing* it!

"SEE YOU AT THE POLLS!"

"SEE YOU AT THE POLLS!"



FOOD ENGINEERING

Recent Inventions

PRODUCTS

Sweet Potato Food Product Made by Adding Amylolytic Enzyme, Maintaining Under Hydrolytic Conditions Until Sugar Content is 30-65 percent by Weight, Then Inactivating with Heat—G. R. Schermerhorn, Sr., and H. C. Hinz, Jr., *Rochester, N. Y.* to *American Home Foods, Inc., New York, No. 2,598,838. June 3, 1952.*

Fruit Juice Blend Composed of Pineapple Meat and Skin Juice, and Grapefruit Juice With Acidity of 0.72 to 0.76 percent and Brix of 14—15 Deg.—J. A. Bruce to *Prime Products, Inc., Tampa, Fla. No. 2,599,431. June 3, 1952.*

Citrus Juice Products With Stabilized Cloud Made by Incorporating Minor Quantity of Water-Soluable Gum of High Mannogalactan Content—*J. W. Stevens, Upland, and D. E. Pritchett, Ontario, Calif.* to *Sunkist Growers Inc., Los Angeles No. 2,599,519. June 3, 1952.*

Butter Coloring Tablet Composed of Starchy Substance Compressed to More Than 1 g. per cc. and Water Insoluble Dye—*L. Adler, H. A. Reinhardt, and E. E. Ponath* to *Dyestuffs & Chemicals, Inc., St. Louis, Mo. No. 2,600,381. June 17, 1952.*

PACKAGING

Compartmented Shipping Containers for Eggs—*H. C. Reeser, North Hollywood, Calif.* to *The Patent and Licensing Corp., New York City. No's. 2,597,845, 46, 47, 48. May 27, 1952.*

Bottle Filling Machine With Conveyor for Moving Bottles to Elevator and Pusher for Ejecting Bottles from Elevator to Filling Position—*L. T. Cookson,* to *The Upjohn Co., Kalamazoo, Mich. No. 2,597,850. May 27, 1952.*

Machine for Segragating Underfilled Containers Utilizing Buoyant Liquid Weighing Medium—*R. E. J. Nordquist, Maplewood, N. J.,* to *American Can Co., New York. No. 2,597,894. May 27, 1952.*

Packaging Frozen Confections by Freezing, Extruding, Cutting Portions Into Individual Receptacles Which are Conveyed Through Freezing Zone—*H. R. Schulz and C. G. Schulz, Altadena, and A. S. Kedzie, Los Angeles,* to *Redi Products Corp., Pasadena, Calif. No. 2,598,137. May 27, 1952.*

Meat Package Comprising Opaque Imprinted Inner Wrapper, Opaque Overlying Stiffening Member, and Outer Transparent Wrapper—*G. H. Harry, Buffalo, N. Y. No. 2,598,373. May 27, 1952.*

Vertically Rotating Bag Closing and Sealing Machine With Four Sections for Carrying Bags Through Folding, Closing, and Sealing Positions—*H. V. Kindseth* to *Bemis Bros. Bag Co., Minneapolis, Minn. No. 2,559,393. June 3, 1952.*

PROCESSES

Sugar Crystallization in the Presence of Surface Active Agent Selected From Group of Polyhydroxylic and Polyoxyalkylene Compounds—*G. J. King, Hewlett, N. Y.* to *Atlas Powder Co., Wilmington, Del. No. 2,591,704. April 8, 1952.*

Margarine Made Continuously by Cooling to 23-34 deg. C., Agitating Stream of Liquid Fat to Selectively Crystallize Higher Melting Point Glycerides, Mixing With Aqueous Ingredients, Rapidly Chilling and Emulsifying—*A. D. Wilson, Hornchurch, H. B. Oakley, Bromborough, and J. Rourke, Bebington, England* to *Lever Bros. Co., Cambridge, Mass. No. 2,592,224. April 8, 1952.*

Preparing Banana Extracts and Preserves by Storing Fruit Until Exactly Ripe, Removing Peel, Cleaning, Splitting and Removing Core, Mashing, Cooking, Filtering, Mixing With Sugary and Saline Substances, Concentrating in Vacuo, Drying in Hot Air—*L. Reale, New York City. No. 2,592,332 April 8, 1952.*

Preserving Vitamin Content of Rice by Rendering, Rolling, and Diffusing Water-soluble Vitamins From Silver-Coat Into Germ, Fixing by Gelatinizing Kernel-Starch With Heat and Pressure, Drying —*D. S. Fernandes, Paramaribo, Surinam, Dutch West Indies. No. 2, 592,407. April 8, 1952.*

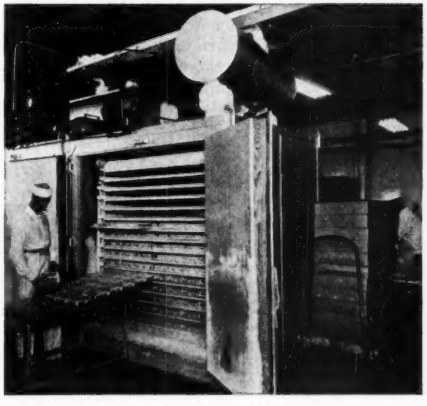
Stabilizing Color of Fruit Prior to Freezing by Contacting With Water Solution Containing Sulfur Dioxide and Acid to Attain pH 1.0-2.5, Then Freezing Without Exposing Treated Surfaces—*J. E. Hall, Mount Vernon, and E. A. Heiss, Bothell, Wash.* to *Wallace & Tiernan Products, Inc., Belleville, N. J. No. 2,592,563. April 15, 1952.*

Want more information on any of these recent patents? If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

Poultry Processors Know It's Right — When They Freeze With

***Amerio* CONTACT PLATE FREEZERS**

(Patent Applied For)



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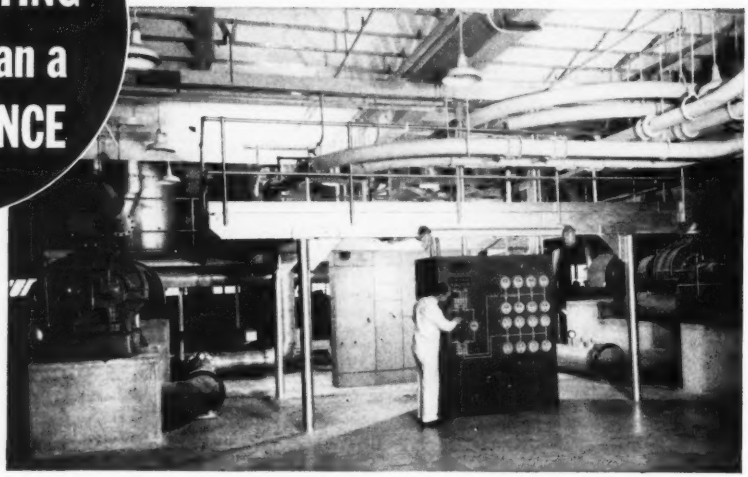

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A-142

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Storage Life of Liquid Eggs Prolonged by Mixing, Freezing at Below 0 deg. F., Storing at 24 deg. F.—*L. B. Jensen, Chicago, and W. R. Hess, Downers Grove, Ill. to Swift & Co., Chicago. No. 2,593,308. April 15, 1952.*

Eliminating Sugar From Egg Whites By Fermenting With Concentrated Culture of Lactobacilli, Streptococci, and Aerobacter, Said Microorganisms Being in the Non-Proliferating State—*A. M. Kaplan, Hyattsville, Md., and M. Solowey, Washington, D. C. to U.S.A. No. 2,593,462. April 22, 1952.*

Canning Salted Foods by Adding Hydrochloric Acid to Reduce pH Below 4.5, Sealing in Can, Sterilizing at Acid Value, Adding Sodium Hydroxide Aseptically to Form Sodium Chloride in a Palatable Amount, and Holding for a Few Days to Allow Complete Salt Formation—*O. Rahn, Ithaca, N. Y. No. 2,594,213. April 22, 1952.*

Treating Fish-Press Fluids by Spray-Drying in Non-Oxidizing Atmosphere at Temperature of 150-160 deg. F., Separating Concentrate From Vapor—*D. B. Vincent, to Dan B. Vincent, Inc., Tampa, Fla. No. 2,595,180. April 29, 1952.*

Recovering Protein From Whey by Adjusting pH to 0.06-0, Heating, Agitating, Readjusting pH to 4.1-4.5, Separating—*M. E. Hull, La Grange, Ill., to Armour and Co., Chicago. No. 2,595,459. May 6, 1952.*

EQUIPMENT

Candy Bar Forming and Stick Inserting Machine Utilizing Endless Belt Conveyor and Longitudinally Spaced Cutting Knives With Synchronized Stick Feed and Stick Ejector Wheel—*G. S. Washburn, Macon, Ga. No. 2,591,033. April 1, 1952.*

Circular Can Sealer Comprising Frame With Three Spaced Rollers and Sealing Tape Dispersing Means—*L. P. Cleary, Chicago, and C. G. Farr, Abilene, Texas to Wilson & Co., Inc., Chicago. No. 2,591,136. April 1, 1952.*

Grain Conditioner Consisting of a Stationery Tower With Internal Perforated Casing for Passage of Material and Rotating Frame Discharging Mechanism—*R. F. Marken, Burlingame, Calif. No. 2,591,173. April 1, 1952.*

Machine for Cutting and Embossing Biscuits From Traveling Dough Web Comprising Cutter Head With Reciprocating Bar—*J. Hart, Peterborough, England, to Baker Perkins, Inc., Saginaw, Mich. No. 2,591,256. April 1, 1952.*

Slide-Rule Calculator for Grading Hog Carcasses That Takes Into Account Fat-Back Thickness, Live Weight, Carcass Weight and Length—*R. E. Botts, Madison, Wis. to Oscar Mayer & Co., Inc., Chicago. No. 2,591,504. April 1, 1952.*

Machine for Making Coffee Rings Comprising a Rotating Circular Platform to Sustain Dough Strip With Circular Row of Kneading Rollers Working on Vertical Axes and Opposite to Platform—*C. Hettinger, West Englewood, N. J. No. 2,591,546. April 1, 1952.*

Barrel Type Cooker With Slidable Hinged End Plates and Rotating Feed Screw Integrated With End Plate Movement—*N. J. Peters, and W. Bradley, to Damrow Bros. Co., Fond du Lac, Wis. No. 2,591,601. April 1, 1952.*

Brewer's Cereal Cooker Consisting of Closed Vessel Equipped With Recirculating System Utilizing a Venturi Tube—*F. Muller, Elmhurst, N. Y. No. 2,592,170. April 8, 1952.*

Device for Proportioning Secondary to Primary Fluid With Primary Fluid Reservoir Containing Float That Actuates Valve in Secondary Fluid Line—*A. J. Lubeley, to Anheuser-Busch, Inc., St. Louis, Mo. No. 2,592,304. April 8, 1952.*

Apparatus for Charging and Storing Materials Consisting of Bin Served by Elongated Screw Conveyor Equipped With Liquid-Bearing Vaned Shaft Extension—*W. R. Graham, Jr., Wilmette, Ill. and J. Chrisman, to American Dairies, Inc., Kansas City, Mo. and The Quaker Oats Co., Chicago. No. 2,592,559. April 15, 1952.*

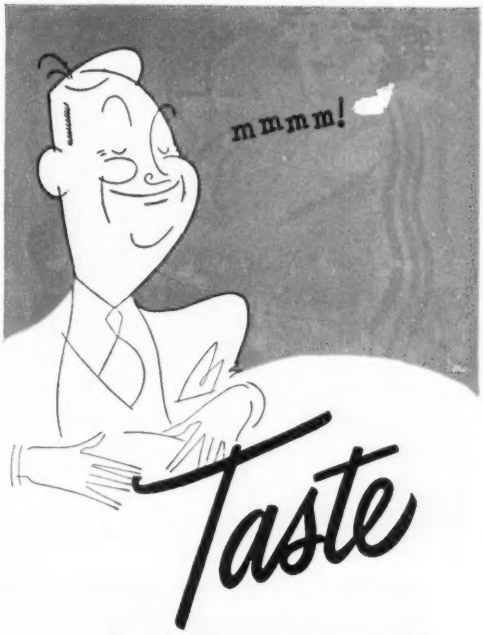
Machine for Linking Sausage Consisting of Frame and Hand-Turned Rotating Rods Which Support Sausage Under Tension and Form Links—*J. M. Miller, Kansas City, Mo. No. 2,592,939. April 15, 1952.*

Sugar Cane Juice Clarifier Consisting of Upright Tank With Plurality of Product Feed Pipes Radiating From Distributor Head and Spaced Inverted Cup Clarifier Vessels With Body of Tank for Discharging Liquor—*E. G. Koch, Bayou Goula, La. No. 2,593,036. April 15, 1952.*

Oven With Baking Chamber Served by Conveyor and With Longitudinal Recesses in Side Walls Providing Baking Area for Goods Disposed on Edge of Conveyor—*E. M. Crosland, Culcheth, near Warrington, England, to T. & T. Vicars, Ltd., Earlestown, Newton-le-Willows, England. No. 2,593,273. April 15, 1952.*

Correction

The company assignment listed for the product "Nonsogging Pie Crust Mix," Patent No. 2,586,945, page 230 May FE, has been found to be in error. Correctly, the assignment is to Pillsbury Mills, Inc., Minneapolis.



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Men & Companies

H. P. Alspaugh has been appointed to newly created position of manager of marketing and sales research for the H. J. Heinz Co.

Industry

Buffalo Frosted Foods Co., Inc., New York, had its processing plant destroyed by fire recently. Estimated loss: $500,000.

Clinton Foods, Inc., plans early construction of a multi-million-dollar citrus concentrate plant at Frostproof, Fla.

Consolidated Dairy Products Co., Seattle, has purchased the extensive properties of Alpine Dairy. Price: $2,600,000.

Crystal Ice & Cold Storage Co., Phoenix, will shortly construct a vacuum cooling plant for lettuce. Cost: $200,000.

Falkner's Dairy, Inc., N. C., has been organized to deal in dairy products. Capitalization: $100,000.

Froedtert Grain & Malting Co. opened its new laboratory recently in Milwaukee. Cost: $300,000.

General Mills Research Laboratories has appointed Ralph H. Manley managing director.

Gaultois Fisheries Ltd., Newfoundland, has begun operations in its 5,000,000 lb.-per-year plant.

Guava Corp., South Miami, Fla., is producing frozen concentrated guava juice. (This new product was discussed in the article "11 New Guava Products," FE, Mar. '52, page 141).

P. D. Gwaltney, Jr., & Co., Inc., packer and processor in Smithfield, Va., has increased its maximum capital stock. Rise: From $500,000 to $1,500,000.

Horlicks Corp. now has Paddy Campbell and T. C. Thompson as board members.

Jell-O Division of General Foods suffered a fire recently. Loss: $75,000.

Klondike Canning Corp., packer of tomatoes and juice, is now owned by the Purdue University Agricultural Alumni Seed Improvement Assn.

Kraft Foods Co. expects to initiate construction of offices and plant facilities in Seattle shortly. Cost: $180,000.

National Dairy Products Corp. has acquired Humko Co. and Trendex Co., both of Memphis.

Nestle Co., Inc., has increased its maximum capital stock. Rise: From $16,000,000 to $40,000,000.

Pepsi-Cola Bottling Co., Alexandria, Va., is in the process of increasing its capacity from 720,000 cases to 1,250,000 per yr.

Rosenberg Bros. & Co., San Francisco, is modernizing its raisin plants. Cost: $500,000.

Sheffield Farms Co. has sold its $3,000,000 dairy plant located in Manhattan Island, N.Y.C. Plant is destined for industrial use.

Stokely-Van Camp, Inc., had its main processing plant razed by fire recently. Loss approached $200,000.

Sunshine Biscuit, Inc., plans construction of a plant in Columbus, Ga. Investment is expected to exceed $5,000,000.

Personnel

William A. Bingham has re-

George C. Wilder has been made president and a director of the Macwhyte Co.

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Effective Quality Control

The Orkin Institute will make an appraisal of adequacy and effectiveness of your present quality control program as it measures the sanitation aspects of your plant and product and compliance with requirements and regulations. We can assist you in making desirable modifications in your own program, and can furnish services of our own laboratory. All work done in the Institute laboratory is supervised by staff members not only well-trained in their particular field, but also equipped with industrial and regulatory experience.

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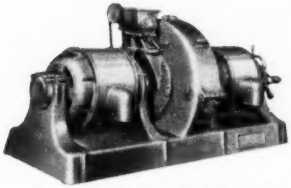
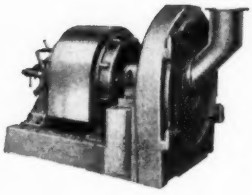
Bauer ATTRITION MILLS



Bauer Double Revolving Disc Attrition Mill. Two built-in motors or sheaves for belt drive. 30 to 600 hp.



Bauer Single Revolving Disc Attrition Mill. Built-in motor or pulley for belt drive. 2 to 450 hp.

Sizes: 8", 18", 24", 30", 40".

Used for grinding, granulating, decorticating, intensive mixing and blending.

Our sales engineers are qualified to design efficient cleaning, feeding, crushing, milling, and separating systems. They'll be glad to confer with you.

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Exclusive scroll effect design, built in assures you of efficient performance against normally encountered static pressures.

Air-Vans are weatherproof and self contained — shipped to your job site completely assembled, ready to install. You get all the economies of direct connection in a superb low silhouette unit. Air Vans have been built to a standard of rugged dependability. Compare Air-Van material specifications and you'll see the difference.

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Performance Ratings CERTIFIED by an independent laboratory.

Cap: 150-11,000 CFM: Static Pressures to 13/4".

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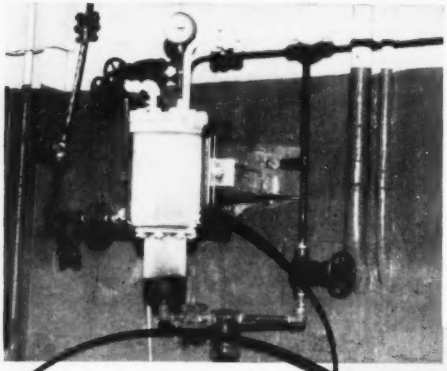
Want More Refrigerating Capacity from Your Present System?



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HOW many tons additional refrigeration would a 5% increase in capacity net you? You can probably get at least a 5% boost simply by installing an Armstrong Forged Steel Purger to automatically remove *all* air and other non-condensables. Most plants relying on manual purging are *not* getting all the air out and efficiency is suffering accordingly.

YOUR COMPRESSOR HEAD PRESSURE TELLS THE STORY

CHECK the head pressure of your system and compare with what it should be. Every 4 lbs. excess pressure means 1% less capacity and 2% greater power costs. Non-condensable gas is the cause.

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COMPLETE air removal with an Armstrong Purger not only increases capacity but results in power, labor, water, and refrigerant savings as well. The case studies at right indicate the scope of these savings.

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. . . fully explains Armstrong Purgers, their benefits, and why you get them.

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866 Maple Street, Three Rivers, Mich.

IT WAS FOR THESE PLANTS:—

- **Velvet Freeze, Inc., Kansas City, increased capacity 7½%, saved $255 in ammonia in six months and reduced power costs $274 a month.**
- **Planters Nut & Chocolate Co., Suffolk, Va., increased capacity 5%, cut power costs $250 per month.**
- **Crystal Ice Service, Inc., New Orleans, increased plant capacity 6% when an Armstrong Purger lowered head pressure 25 lbs.**
- **H. A. McDonald Creamery, Detroit, increased capacity 7½%, cut power costs $275 per month.**

ARMSTRONG PURGERS

Ralph M. Watson is now director of research for Worthington Corp. He succeeds Paul Diserens.

sumed duties as vice-president, general manager, and director of the Coca-Cola Bottling Co. of Oregon.

Vincent L. Browner, Des Moines, Iowa, will be next president of the National Assn. of Retail Grocers.

Thomas A. Cuneo, president of Ronco Foods, Memphis, has been elected president of the National Macaroni Manufacturers Assn.

Maurice C. Dreicer, well-known gourmet, has been made supervisory consultant to Buitoni Macaroni Corp.

Arthur L. Gluek is newly elected president of Gluek Brewing Co., succeeding the late Alvin C. Gluek.

Philip P. Gott, Chicago, has been re-elected president of the National Confectioners Assn.

Guy V. Graham is now vice-president of salmon operations and sales for Libby McNeill & Libby, Seattle.

G. D. Gwinn, Louisville, Ky., has been elected vice-president and a director of Standard Foods, Inc.

Dr. John W. Hibbs, associate professor in the dairy department of Ohio Agricultural Experiment Station, has been awarded the Borden Award for outstanding dairy research.

N. S. Hymer of the National Biscuit Co., is new president of the Asparagus Club.

Stuart Johnstone has been named vice-president of McGavin Ltd., Edmonton, and McGavin Bakeries Ltd., Vancouver.

Jack Karger, vice-president of Snow Kist Frozen Foods, Inc., will take on duties as president of Eastern Frosted Foods Assn.

Ralph W. Keller, general manager of Chicago operations for Hormel & Co., has been made president of the National Meat Canners Assn.

William A. McKinley is newly elected president of Midland Steel Products Co.

Edmond Opler, president of Cook Chocolate Co., Chicago, is in Europe visiting chocolate plants in France, Switzerland, Germany, Holland, and England.

Raymond F. Peasback is now manager of the advertising and sales promotion department of the Dairymen's League Cooperative Assn.

Sir Charles Tupper has been named president of Manitoba Sugar Co., succeeding G. H. Atkins.

Prof. E. H. Wiegand has retired from the Food Technology Dept. of Oregon State College after 32 years as its head.

Edward E. Wilkie is now president of Pacific American Fisheries, Bellingham, Wash.

M. E. Ziegenhagen has been named advertising and sales promotion manager of Worthington Corp.

Associated Industry

Allis-Chalmers Mfg. Co. has elected R. S. Stevenson executive vice-president.

Aluminum Co. of America has appointed Frank L. Magee a director.

American Can Co. has begun construction of a plant at Harrisburg, Pa., and will shortly open another at Stockton, Calif.

Borg-Warner Corp. recently acquired Reflectal Corp., producer of aluminum-foil insulation.

Continental Can Co. an-

N. W. Postweiler has been appointed packaging engineer of the Riegel Paper Corp.

John A. Leslie is new assistant sales manager for the packaging machine division of Lynch Corp.

---

nounces establishment of a full tuition scholarship in food engineering at Illinois Institute of Technology, Chicago.

Cutler-Hammer, Inc., Milwaukee, has appointed H. B. Phillips sales manager, quantity sales div.; F. A. Wright sales manager, district sales; and J. M. Cook sales manager, industrial control div.

Graver Water Conditioning Co., N.Y.C., announces creation of a research and product development department under direction of Vincent J. Calise.

International Minerals & Chemical Corp. has made T. M. Ware and E. D. McDougal, Jr., vice-presidents and C. M. Edwards secretary.

Jenkins Bros., valve maker, has appointed Herbert H. Jaynes, as New England manager.

Kewanee-Ross Corp., formerly Kewanee Boiler Corp., Kewanee, Ill., and Ross Heater & Mfg. Co., Buffalo, N. Y., announce selection of C. H. Currier as board chairman and W. B. Russell as president.

McCray Refrigeration Co., Inc., Kendallville, Ind., has made J. W. Bostwick sales manager.

Philips Packing Co. has re-elected its entire slate of officers and board directors.

Shippers' Car Line Corp. has appointed John P. Krumech vice-president.

Westinghouse Electric Corp. announces intentions of building a multi-million-dollar lighting equipment plant in Vicksburg, Miss.

Wheelco Instruments Div., Barber-Colman Co., now has its plant facilities located in Rockford, Ill.

Deaths

Dr. E. C. Auchter, former president and director, Pineapple Research Institute.—Jul. 8.

Svend Asp, 64, owner of Salt Sea Fisheries salmon cannery, Tenakee, Alaska.—Jun. 10.

Norwood Lee Beville, 62, part owner and manager of Blackstone Bottling Co., Va.—Jun. 22.

R. C. Brower, 60, secretary-treasurer and director of Timken Roller Bearing Co.—Jul. 13.

Joseph M. Coppinger, 60, general purchasing agent of International Minerals & Chemical Corp.—Jun. 19.

Alan D. Faulkner, 58, general plant manager for Armour and Co., Atlanta, Ga.—Jun. 16.

Donald B. Hause, 54, advertising manager of Armour and Co., Chicago—Jun. 8.

Clark Hempstead, 78, former Pillsbury Mills president and co-chairman.—Jun. 29.

Michael Hendler, 56, president of Borden's Ice Cream Co., Wilmington, Del.—Jun. 8.

John A. Latzer, 75, president of Pet Milk Co.—Jun. 29.

Bernard H. Smith, 64, founder and chairman of the Virginia Dare Extract Co.— Jul. 4.

Norman L. Waggoner, 65, president of the Santa Clara Packing Corp. and also of Waggoner Food Co., both of Calif.—Jul. 3.

H. S. Walker, 74, considered by many as "father" of sugar technology in the Philippines and Hawaii.—Jun. 12.

William J. Wardell, 64, vice-president and director of American Can Co.—Jul. 8.

Jack Barricini, 49, president and one of founders of Barricini Candies, passed away Jun. 14.

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Steelcote Damp-Tex
Mass White
Based on the experience of more than 9600 industrial plants, improved DAMP-TEX proves less expensive in actual usage. Shutdowns to dry out wet walls and equipment are reduced or eliminated. Greater coverage, superior hiding qualities and resistance to moisture, steam, 2% caustic, corrosive acids, gases and other industrial conditions, assures longer life. DAMP-TEX adheres to any paintable interior wet or dry surface—dries to a beautiful porcelain-like finish. Will not taint foods.
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For equipment and metal surfaces subjected to extreme acid and alkali conditions. Brush or spray costs less than 4¢ sq. ft. Write for information.
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This is an excellent example of how to get full value from your shipping box. Attractively printed, this H & D corrugated box serves a two-fold purpose:

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Just Off the Press

New Catalogs and Bulletins from manufacturers of equipment and supplies —Free For The Asking—

Food Plant Equipment

Atmosphere Generators

Bulletins N-452 and I-552 discuss nitrogen and inert atmosphere generators, respectively. Applications and features are subjects of both. 4 pages each.—*Gas Atmospheres, Inc., 20005 W. Lake Rd., Cleveland 16.*

Circle L231A on Reader Service Card

Ice Cream Cup Filler

Speed is stressed in brochure describing ice cream cup filler: 100 per min. or 500 doz. per hr. Construction and sanitation aspects are additional details covered. 4 pages.—*Triangle Package Machinery Co., Bagby Div., 6633 55 W. Diversey Ave., Chicago 35.*

Circle L231B on Reader Service Card

Baking Ovens

Various types of baking ovens are treated in illustrated catalog. Included are revolving tray and traveling tray ovens, hearth, cookie and cracker ovens. 16 pages. — *Washington Industrial Products, 3600 Airport Way, Seattle 4.*

Circle L231C on Reader Service Card

Air Conditioning Pumps

Combination pump-motor units are illustrated in Form 7177. Installations for air conditioning service—cooling towers, evaporative coolers, etc.—are shown, and hp. ratings are given. 12 pages.—*Ingersoll-Rand Co., 11 Broadway, New York 4.*

Circle L231D on Reader Service Card

Fruit Machinery

Savings in time, money and manpower are claimed for four fruit processing machines. Photos support text. Bulletin 102, 4 pages.—*Dudley Machinery Corp., Mountain View, Calif.*

Circle L231E on Reader Service Card

Fluid Agitators

Turbine-type mixers for open and closed tanks are featured in Catalog B-102. Available in sizes from 1 to 500 hp. 32 pages.—*Mixing Equipment Co., Inc., 200 Mt. Read Blvd., Rochester 11, N. Y.*

Circle L231F on Reader Service Card

Cans and Tanks

Weigh cans and receiving tanks are new bulletin's topics. Sanitation, capacities, and uses are factors presented on these stainless steel units. 12 pages.—*Lathrop-Paulson Co., 152 W. 42nd St., New York 18.*

Circle L231G on Reader Service Card

Oil Valves

Units described in Leaflet 719 are for control of flow of oil to oil burners but are stated applicable for use in handling vegetable oils, syrups, water, liquid chemicals, and other fluids.—*Hauck Mfg. Co., 124-136 Tenth St., Brooklyn 15.*

Circle L231H on Reader Service Card

Worm Gears

Voluminous Catalog 400 gives complete line of worm gear speed reducers plus worm and gear sets for built-in power transmission applications. 180 pages.—*Cleveland Worm & Gear Co., 3249-59 E. 80th St., Cleveland 4.*

Circle L231I on Reader Service Card

Pretzel Machines

Automatic and adjustable for production of pretzels of all types and sizes, various model "twisting" machines are discussed in 6-page folder. —*Reading Pretzel Machinery Corp., Reading, Pa.*

Circle L231J on Reader Service Card

Steam Generator

Advance design features are stated to distinguish unit steam generator shown in Bulletin 2000. Supplementing presentations are cutaways and photos. 26 pages.—*Preferred Utilities Mfg. Corp., 1860 Broadway, New York 23.*

Circle L231K on Reader Service Card

Vat for Liquids

Insulated, stainless steel-lined vat for mixing and storing liquids is subject of new brochure. Capacities are 100 to 1,000 gal. in 11 standard sizes. 4 pages.—*Cherry-Burrell Corp., 427 W. Randolph St., Chicago 6.*

Circle L231L on Reader Service Card

Anent Mixers

Emulsifying, homogenizing, and dispersing are functions of mixers newly described in 4-page folder. —*Barrington Engineering Corp., 110 W. 40th St., New York 18.*

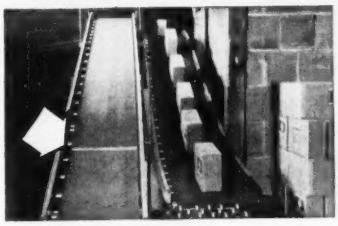
Circle L231M on Reader Service Card

Heat Exchanger

Adaptability and simplicity are noted in bulletin presenting data on hollow-flight processor heat exchanger. Accompanied with excel-

ALLIGATOR®

CONVEYOR BELT LACING



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- ★ Excellent for flat conveyors, package conveyors, portable loaders, etc. specify Stainless or Monel.
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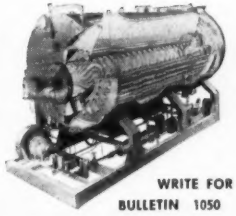

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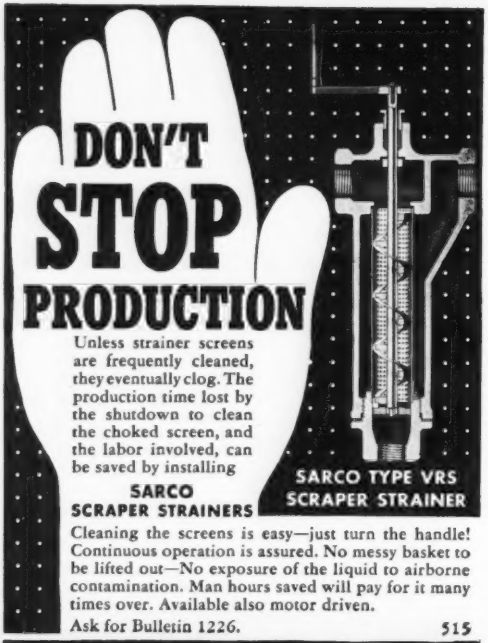
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Unless strainer screens are frequently cleaned, they eventually clog. The production time lost by the shutdown to clean the choked screen, and the labor involved, can be saved by installing
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Cleaning the screens is easy—just turn the handle! Continuous operation is assured. No messy basket to be lifted out—No exposure of the liquid to airborne contamination. Man hours saved will pay for it many times over. Available also motor driven.
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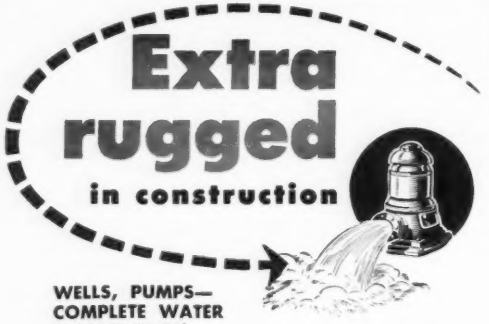
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lent diagrams. 8 pages.—*Western Precipitation Corp., Chrysler Bldg., New York 17.*

Circle L231N on Reader Service Card

Packaged Dryers

Operational features highlight bulletin describing packaged dryers. Will handle fragile or heat sensitive materials. 4 pages.—*Wyssmont Co., Northern Blvd., Long Island City, N. Y.*

Circle R232A on Reader Service Card

General Purpose Pump

Centrifugal, horizontal, split case pump is discussed in Bulletin B-1350. Among features are short shaft and mechanical seal. Data on capacities, heads, and drives are given. 8 pages.—*Peerless Pump Div., Food Machinery & Chemical Corp., Indianapolis 8.*

Circle R232B on Reader Service Card

Valves and Fittings

Inventory on valves, fittings, and specialties is offering of bulletin now available. Quantities, sizes, types, and pressures are listed. 8 pages.—*H. P. Sherman Co., Inc., 210 Kent Ave., Brooklyn, 11.*

Circle R232C on Reader Service Card

Gear Motor Line

Compact housings with speed ratios from 2.5:1 to 97:1 are among features of gear motors described in Bulletin B-601. Units are adaptable for horizontal, sidewall, ceiling, or vertical mounting. 8 pages.—*Star-Kimble Motor Div., Michle Printing Press & Mfg. Co., Bloomfield, N. J.*

Circle R232D on Reader Service Card

Sugar-Cube Units

Production of sugar-cubes via redesigned units is topic of bulletin, *Pressed Sugar.* Complete plant layouts are available with capacities of 6,000 to 110,000 cubes hourly. 8 pages.—*Standard Steel Corp., 5045 S. Boyle Ave., Los Angeles 58.*

Circle R232E on Reader Service Card

Steam Traps

Bulletin 152 outlines steam traps equipped with bellows of bronze, Monel, or stainless. Bodies are bronze, semi-steel, or cast steel. Sizes ½ to 2 in. are for pressures from 0 to 300 lb. 12 pages.—*W. H. Nicholson & Co., 12 Oregon St., Wilkes-Barre, Pa.*

Circle R232F on Reader Service Card

Control Equipment

Instrumentation Catalog

Fundamentals of Instrumentation for the Industries is title of Catalog 80-2. Study covers measurement, control, and transmission of variables, plus extensive application data. 126 pages.—*Minneapolis-Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44.*

Circle R232G on Reader Service Card

Reagents & Chemicals

Recent folder lists laboratory reagents and chemicals. Along with products are found special apparatus, including titration flask stated easier in detecting end points. 4 pages.—*Jasonols Chemical Corp., 1085 Myrtle Ave., Bklyn 6, N. Y.*

Circle R232H on Reader Service Card

Selection Devices

Guide for selection of electric and electronic controls, devices, and accessories is designated Bulletin GEA-5781. Contained are quick-reference data, photos, and listings of additional publications relative to topics discussed. 8 pages.—*General Electric, Schenectady 5, N. Y.*

Circle R232I on Reader Service Card

Photoelectric Units

New catalog describes and illustrates line of amplifier relays, light source, and phototube units of standardized design. Uses listed are in counting, weighing, packaging, wrapping, bottle filling, plus inspection for size. 4 pages.—*De-Tec-Tronic Laboratories, Inc., 1711 Terra Cotta Pl., Chicago 14.*

Circle R232J on Reader Service Card

Liquid Controls

History, operation, and uses of floatless liquid-level controls are a few of features in recent brochure. Well-documented information gives data on magnetic contactors, starters, and relay combinations. Pump controls and alternating current solenoids are among additional units described. 36 pages.—*B/W Controller Corp., 2200 E. Maple Rd., Birmingham, Mich.*

Circle R232K on Reader Service Card

Light Circuit Boards

Panelboards for lighting circuits and power are keynoted in Bulletin 500. Many types are shown and there are listings on functions and applications. Also, prices are given. 24 pages.—*Continental Electric Equipment Co., Box 1055, Cincinnati 1.*

Circle R232L on Reader Service Card

Dust Controllers

Specifications and dimensions on dust control equipment are given in Bulletin 909A. Various systems are outlined. 28 pages.—*Pangborn Corp., Hagerstown, Md.*

Circle R232M on Reader Service Card

Boiler Safety Devices

Bulletin SC-2 displays safety devices for steam and hot water

boilers plus heaters. Capacity curves, dimensional drawings, and engineering data are included. 24 pages.—*McDonnell & Miller, Inc., 3500 N. Spaulding Ave., Chicago 18.*

Circle R232N on Reader Service Card

Liquid Meters

Facts relating to processing, batch mixing, and cost control operations are developed in Bulletin 566 on liquid meters. Pressure to 500 psi. is offered. 20 pages.—*Neptune Meter Co., 50 W. 50th St., New York 20.*

Circle L233A on Reader Service Card

Scale Catalog

Conveniently arranged by types of weight indication, scales for use in the food plant are among the numerous units pictured in comprehensive Catalog 11. 28 pages.—*The Howe Scale Co., Rutland, Vt.*

Circle L233B on Reader Service Card

Materials Handling

Overhead Guard

Protection of operator is stressed in leaflet discussing special forklift truck overhead guard. Made of 1½ in. and 2 in. pipe, this accessory is recommended for use on trucks with lift exceeding 144 in.—*Towmotor Corp., 1226 E. 152nd St., Cleveland 10.*

Circle L233C on Reader Service Card

Carton Lift

Ability to handle heavy cartons without pallets is a feature of new lift truck described in Leaflet DR-26.—*Towmotor Corp., 1226 E. 152nd St., Cleveland 10.*

Circle L233D on Reader Service Card

Truck Accessories

Attractive Catalog 552 offers attachments, tools, and accessories to increase ease of materials handling with industrial trucks. 24 pages.—*Hyster Co., 2902 N. E. Clackamas St., Portland 8.*

Circle L233E on Reader Service Card

Storage Racks

Bulletin 5221 shows steel storage racks for drums, barrels, crates, bins, skids, and pallets, and applications are illustrated. 12 pages.—*Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9.*

Circle L233F on Reader Service Card

Unscrambling System

Basket dumper, spreading table, can unscrambler, and elevator are four units depicted in Bulletin 101. Speed rate of equipment is put at 750 cans per min. 4 pages.—*Dudley Machinery Corp., Mountain View, Calif.*

Circle L233G on Reader Service Card

Tramrail Cranes

Efficient performance of tramrail cranes is reported in Vol. 8, No. 1 of *Crane Graphic*. Well illustrated and documented. 8 pages.—*Cleveland Crane & Engineering Co., 1014 E. 289th St., Wickliffe, Ohio.*

Circle L233H on Reader Service Card

Electric Fork Truck

Rugged but light truck is topic of new bulletin. Unit may be adapted to receiving, production, feeding, shipping, and warehousing problems. 12 pages.—*Lewis-Shepard Products, Inc., 125 Walnut St., Watertown, Mass.*

Circle L233I on Reader Service Card

Air-Activated Conveyors

Pneumatic conveying systems for handling fine-granular and dry-pulverized food products in bulk are presented in Bulletin 313. Engineering counsel is also offered. 4 pages.—*Robinson Air-Activated Conveyor Systems, 205 E. 42nd St., New York 17.*

Circle L233J on Reader Service Card

Heavy-Duty Tractor

Booklet P-996 presents specifications on heavy duty electric tractor for towing applications. 4 pages.—*Yale & Towne Mfg. Co., Philadelphia Div., Philadelphia 15.*

Circle L233K on Reader Service Card

Plant Supplies

Floor Resurfacer

Factory mixed floor resurfacer is subject of recent leaflet. Material is composed of pulverized natural rubber, asphalt-rock limestone, and cold asphalt emulsion. Maker states it has less tendency to become brittle in sub-freezing weather, providing good traction when wet.—*Flash-Stone Co., Inc., 30 E. Rittenhouse St., Philadelphia 44.*

Circle L233L on Reader Service Card

About Silicones

What's a Silicone? is title of new bulletin which, after answering question, goes on to tell how uses extend to defoamers, lubricants, water repellents, insulation, as well as glass cleaners. 24 pages.—*Dow Corning Corp., Midland, Mich.*

Circle L233M on Reader Service Card

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Product characteristics are sum-

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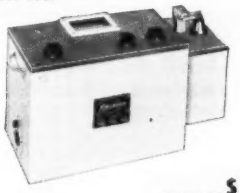
STEINLITE 300 maturity tester

The fastest, surest, lowest cost way to improve uniformity and quality of pack. Increase your profits this year with more EXTRA FANCY corn selected by testing moisture with a Steinlite 300 LSC.



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IF YOU CAN OR FREEZE OTHER VEGETABLE AND MEAT PRODUCTS WRITE FOR INFORMATION. Learn how the Steinlite 300 LSC can help you control uniformity, increase quality and yield of your pack. **Write today for complete facts. No obligation, of course.**

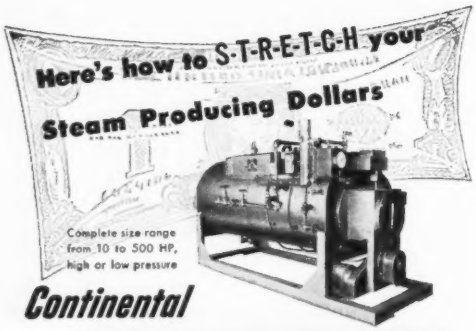
SEEDBURO EQUIPMENT CO.

734 Converse Building Chicago 6, Illinois

Experts Say Natural Spices Give Fuller Flavor and Aroma

Test panelists of Foster D. Snell, Inc., one of America's leading scientific laboratories, say "foods flavored with natural spices have higher quality in taste and aroma; yield truest spice flavor; have greatest stability of flavor." The natural way to better food products is nature's way. Natural spices have been accepted for 2,000 years as the sure way to fine product quality.

AMERICAN SPICE TRADE ASSOCIATION
82 WALL STREET
NEW YORK 5, N. Y.



Continental

PACKAGED AUTOMATIC BOILERS

The Continental Automatic Boiler is easily installed at low cost. With a guaranteed high operating efficiency, it assures you continuing savings year after year. Steam moisture content at less than 1% is proven by independent laboratory tests. Fully automatic, the Continental assures a high heat transfer with resultant low gas temperature at the stack. No furnace refractory makes possible easy access to front and rear of boiler through hinged doors. Economically burns oil, gas or combination. Some sizes carried in stock. Details and specifications gladly sent on request. Write today!

Contact your local supplier today, or write

BOILER ENGINEERING AND SUPPLY COMPANY, INC.
Manavon Street • Phoenixville, Pa.
40 Years of Boiler Experience

"We have used your Bin-Dicators in our fertilizer plant for some time and would not be without them. I can show you a case where a single Bin-Dicator replaces a man." writes a New England manufacturer.

BIN-DICATOR "keeps an eye" on levels of bulk materials in silos, hoppers, bins, chutes and automatically reports to central control point. Prevents over-filling; prevents overfeed and underfeed to conveyors and filling equipment; prevents delays and waste. Low cost, easy to install, simplest operation. Widely used.

BIN-FLO Aerator Units keep dry, finely ground materials moving in bins, hoppers, chutes; prevent packing, bridging.

THE BIN-DICATOR CO.
13946-R Kercheval • Detroit 15, Mich.

NEW 1952 CATALOG FREE

marized in new bulletin explaining use of metal protective coating. These are (1) resistance to creep corrosion, (2) long life, (3) self-healing qualities, and (4) sufficient pliability to bridge cracks and joints. 22 pages.—*Arco Co., 7301 Bessemer Ave., Cleveland 27.*

Circle L233N on Reader Service Card

Paint Coatings

Special paints are topic of manual, *Special Maintenance Coatings*. Uses extend to proofing against weather, and chemicals, and averting of skidding. 4 pages. —*United Laboratories, Inc., 16801 Euclid Ave., Cleveland 12.*

Circle R234A on Reader Service Card

Rubber Hoses

Data on rubber-hose assemblies is detailed in Catalog 3-1952. Instances of use include utilization in lubrication, hydraulic operations, and paint and solvents spraying. 8 pages.—*Carlyle Rubber Co., Inc., 62-66 Park Pl., New York 7.*

Circle R234B on Reader Service Card

Floor Manual

Your Floors and How to Maintain Them gives information on score of floor problems. All types of general flooring are covered. 42 pages.—*Multi-Clean Products, Inc., 2277 Ford Parkway, St. Paul 1, Minn.*

Circle R234C on Reader Service Card

Service Kit

Attractive kit detailing sanitation servicing is new offering. Pamphlets directly concerned with brewing, candy, meat, and dairy plants are included.—*Oakite Products, Inc., 22 Thames St., New York 6.*

Circle R234D on Reader Service Card

Surface-Active Agents

Nonionic surface-active agents of the polyoxyalkylene fatty ester type are reviewed in recent release. Uses extend to emulsifying, thickening, stabilizing, and other operations. 4 pages.—*Alrose Chemical Co., Providence 1, R. I.*

Circle R234E on Reader Service Card

Spain & Sorbitol

New Spanish edition on sorbitol, polyhydric alcohol used in moisture-conditioning, is now available. Nine charts describe properties and related polyols. 24 pages.—*Atlas Powder Co., Wilmington 99, Del.*

Circle R234F on Reader Service Card

Miscellaneous

Beet Sugar Film

Full-color 16mm. film on beet sugar industry is now available. Titled *Sugar U.S.A.*, film runs 28 min. Historical motif is used in tracing product from Napoleonic era to present day period of modern refining. Developed by Western Beet Sugar Producers, Inc., it may be booked at no cost other than shipping, through.—*Modern Talking Picture Serv., Inc., 45 Rockefeller Plaza, New York 20.*

Circle R234G on Reader Service Card

Fire Sprinklers

Excellently-illustrated booklet presents facts on sprinklers and their contribution to fire control. 38 pages.—*Automatic Sprinkler Corp. of America, Youngstown 1.*

Circle R234H on Reader Service Card

L.A. Industrial Facilities

Opportunities for food and allied-field enterprises in the Los Angeles area are given notable emphasis in the well-illustrated plastic-bound publication, *Label Your Industrial Future F. O. B. Los Angeles.* 40 pages.—*Dept. of Water & Power, 207 S. Broadway, Los Angeles 12.*

Circle R234I on Reader Service Card

Filing Records

Complete facts on each account are stated readily accessible using new filing process. Colored signals indicate delinquent accounts and any facts requiring fast action. Bulletin KD 648, 6 pages.—*Remington Rand Inc., 315 Fourth Ave., New York 10.*

Circle R234J on Reader Service Card

Corrugated Boxes

Basic factors in choosing corrugated boxes are outlined in Booklet 13. Strength, economy, and adaptability to product are some of subjects covered. 30 pages.—*Hinde & Dauch Paper Co., Sandusky, Ohio.*

Circle R234K on Reader Service Card

Punch Reinforcer

Combination of punching and reinforcing in one action is possible using new unit described in leaflet.—*Stationers Supply Corp., 82 Wall St., New York 5.*

Circle R234L on Reader Service Card

Free Literature—Quick Way

Any of these very-latest catalogs, bulletins, or folders will be sped to you gratis. Just note here the specific literature you want, then circle each key number (there's one given at the bottom of each item) on the handy Readers Service postcard inside the back cover. Then sign at the bottom and mail. No postage is required.

For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.

Want more information about products and services in

FOOD ENGINEERING?

Just in case you may have overlooked it, we call your attention to Free Reader Service in the back of the magazine, next to the back cover. Here you will find listed and indexed, all products and literature described in this issue.

The first part of the Index covers editorial items on new processing and packaging equipment, new supplies, and new literature.

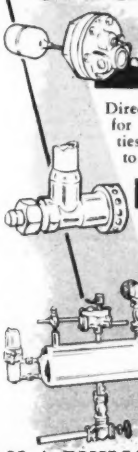
The second part of the Index lists all products and services mentioned in the advertisements.

You will find regular use of the Free Reader Service department a means for getting increased value from your subscription to FOOD ENGINEERING.

The Index number of each item is shown on a prepaid Post Card. Simply circle the Index numbers of the items on which you want more information; fill in your name and address; and mail.

"A Simple CONTROL IS THE Best CONTROL"
. . . for efficiency's sake . . .

SPECIFY PHILLIPS FLOAT CONTROLS



FLOAT CONTROLS

Direct Feed and Remote Feed types adaptable for high side or low side applications. Capacities range from 1 to 1000 tons for "Freon"; 1 to 2000 tons for ammonia.

REFRIGERANT INJECTOR

Phillips refrigerant injection provides high efficiency evaporation with "Freon", especially in high capacity, flooded operation.

LIQUID RETURN SYSTEM

The Phillips system protects ammonia compressors against liquid slop-over and gives dry suction line gas for top compressor efficiency.

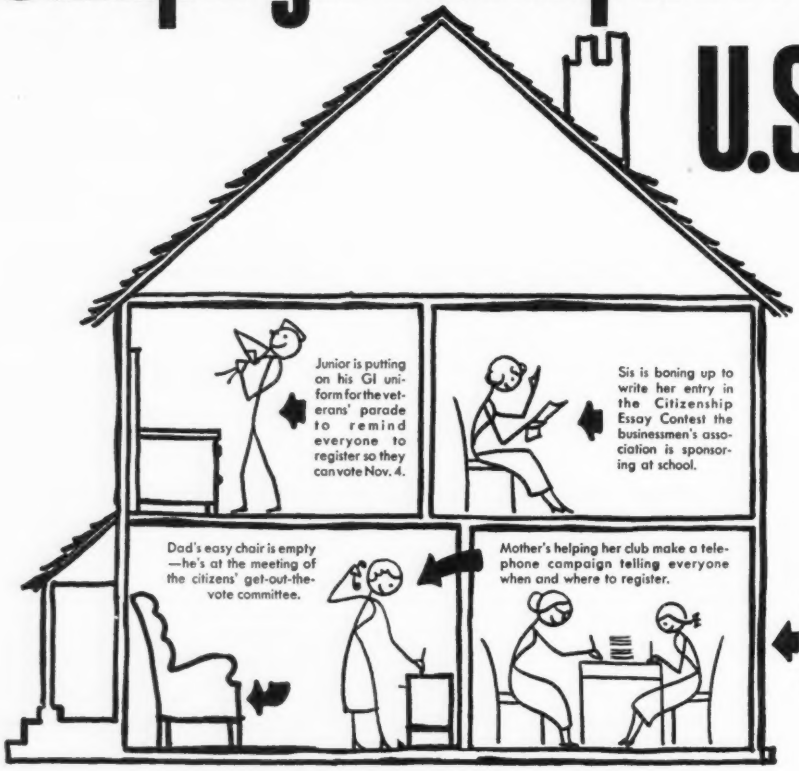
For dependable, efficient operation of your present or new equipment, choose Phillips—engineering advice willingly given. Write for catalog.

H. A. PHILLIPS & CO. DESIGNERS AND ENGINEERS REFRIGERATION CONTROLS SYSTEMS
3255 W. CARROLL AVENUE • CHICAGO 24, ILLINOIS
REPRESENTATIVES: THE C & S EQUIPMENT CO.
2103 S. San Pedro Street, Los Angeles, California
MASON EMANUELS CO. • 90 Dearborn Street, Seattle 4, Washington

ALL IN FLAVOR . . . SAY P&S
FOR THE FINEST IN FLAVOR!
DON'T GUESS . . . USE P & S
POLAK & SCHWARZ, INC.
667 Washington St., New York 14, N. Y.

Special WIPING MATERIALS For the FOOD INDUSTRY
ALL WHITE COTTON MATERIALS
Washed, Sterilized and Inspected
Prices: 38¢ per lb. to 58¢ per lb.
√ Write for FREE SAMPLES and PRICE LIST
ROBERT SATOW Mill Agent
150 BROADWAY NEW YORK 38, N. Y.

Campaign Headquarters U.S.A.


Junior is putting on his GI uniform for the veterans' parade to remind everyone to register so they can vote Nov. 4.
Sis is boning up to write her entry in the Citizenship Essay Contest the businessmen's association is sponsoring at school.
Dad's easy chair is empty —he's at the meeting of the citizens' get-out-the-vote committee.
Mother's helping her club make a telephone campaign telling everyone when and where to register.
Grandma's sending registration reminders to all the church members. Even little Sis is helping—rubber-stamping messages on the cards.

The Family Vote will elect the Next President

NOT THE FARM VOTE...
THE BIG-CITY VOTE...
THE LABOR VOTE...
OR ANY PARTY VOTE...

Politicians talk a lot about this and that "bloc" of voters being decisive factors in this election. So do all the pollsters. You can't blame them for trying to dope it out that way in advance . . . but . . .

YOU know you're going to vote your own sweet way when you get behind that voting booth curtain—that where you live or work hasn't got a blankety-bloc thing to do with how you'll vote. You'll vote for what you believe to be in the best interests of your family—your kids—and your kids' kids.

So YOU know that this year—as always—it will be the FAMILY vote that really decides things. And families are working as never before to make sure every American votes. Right now in millions of American families, everyone from Little Sis to Grandma is pitching in to remind every eligible American to register to make sure of the opportunity to vote. And then they'll tackle the job of getting out the vote of every member of America's 44,000,000 families. They're the biggest "bloc" in America—they ARE America!

If your family is already working at the job—congratulations! If you aren't, talk it over at supper tonight, and pitch in tomorrow.

FOOD ENGINEERING

PROFESSIONAL SERVICES

PROCESSING PROBLEMS — PRODUCT DEVELOPMENT — MARKET RESEARCH — PLANT LAYOUT and DESIGN — PACKAGE DESIGN and TESTING MANAGEMENT — PUBLIC RELATIONS — GENERAL CONSULTING — PATENTS — CHEMICAL, BACTERIOLOGICAL and NUTRITIONAL ANALYSIS

J. PAUL BISHOP AND ASSOCIATES

Consulting Food and Chemical Engineers

Specializing in:
Designing, Estimating and Engineering of New and Modernizing of Old Food and Chemical Plants and Processes.
Internationally Known.
Write P.O. Box 348

Champaign — Illinois

BRADBURY RESEARCH ASSOC., INC.

Food Plant Consultants

PLANT SANITATION—MANDATORY LABELING.
LABORATORY SERVICES: Filth in foods, food analysis, bacteriological tests.

817 Moody Street — Waltham 54, Mass.

FOOD DEVELOPMENT LABORATORY

Consulting Service

S. W. ARENSON, DIRECTOR
Service to the Baking and Potato Chip Industries
Baking, Frying, Chemical, Physical
Product Development Formulation Quality Control

1403 Eutaw Place — 1123 Broadway
Baltimore, Md. — New York, N. Y.

Jacobs-Winston Laboratories Inc.

Food Consultants and Analysts since 1920

James J. Winston, Director

Cereals Eggs Macaroni Noodles Chocolates Oils Vitamins—Drugs U.S.P.—N.F. Assays Filth—Bacteriological tests Sanitary Inspections Food and Drug Libels, Expert Testimony.

156 Chambers St. — New York 7, N. Y.

the advertisements in the SEARCHLIGHT SECTION on the following pages

are live opportunities in the field of food processing and distribution.

Each announcement represents a current Want or Offering of an organization or individual in the field, with some element of profit in each for whoever can fill the need. Some have money-saving possibilities, others are opportunities for more business; many are employment opportunities; still others offer property, or equipment—used or surplus new equipment.

"Searchlight" advertisements are constantly changing. New opportunities are constantly finding their way into this great Want medium, each issue. Regular reading of the "Searchlight" pages can be as important to you as reading the editorial sections; Editorial matter is NEWS OF OPPORTUNITIES offered in the industry.

for EVERY business WANT "Think SEARCHLIGHT first"

Now, more than ever before,

the food industry should take advantage of the opportunity to use the broad experience and knowledge of the consultant and profit by such use.

LEWIN ASSOCIATES

Industrial Consultants

DAVID N. LEWIN, Ph.D., FOOD CONSULTANT
JOSEPH D. LEWIN, CONSULTING ENGINEER
Design — Layouts — Investigations — Consultations—Reports—Market Investigations — Bakeries, Dairy Products—Food Preserving by Heat, Drying, Freezing—Consultation in Managing, Warehousing, Distribution—Formulae, New Products.

1775 Broadway, N. Y. 19, N. Y. — COlumbus 5-3276

KARL B. NORTON & ASSOCIATES

Successors to
DONALD K. TRESSLER & ASSOC.
Food Technologists and Engineers

Specialists in Food Preparation and Preservation; Equipment Testing and Evaluation; Food Freezing; By-Product Utilization; Manufacture of Pure Fruit Flavors.

North Compo Road — Westport, Conn.

WHERE TO STORE FROZEN FOODS

QUAKER CITY COLD STORAGE CO., Inc.

PHILADELPHIA, PA.
3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

New Advertisements

received by August 26th will appear in the September issue subject to limitation of space available. Address copy to the

FOOD ENGINEERING
330 W. 42nd St., New York 36, N. Y.

GUSTAVE T. REICH

Consulting Chemical Engineer

Continuous Processes — Sugar
Complete Plants — Yeast, Molasses
Alcohol - Dry Ice - Waste

1422 Chestnut St. — Philadelphia 3, Pa.

SCHWARZ LABORATORIES, INC.

Consultation on Food Problems
Analyses of Foods and Beverages
Food Plant Design and Process Improvement
Research and Investigations
Legal Testimony
More than 30 years of experience serving the food and beverage industries
Write for bulletin describing facilities and services

202 East 44th Street, — New York 17, N. Y.

FOSTER D. SNELL, INC.

Research Chemists and Engineers

Organoleptic Panel Testing, Formulation and Stability; Protective Packaging.
Inquiries invited on food research problems.
(Official Laboratory Association of Food Distributors, Inc.)

29 West 15th Street, — New York 11, N. Y.
WA 4-8800

STRASBURGER & SIEGEL

Chemists — Bacteriologists — Food Technologists
Specialists in Canned and Glassed Foods Laboratory Services

Testing Tomato Products, Mayonnaise, Pickles, Oils, Fats, Beverages, Sugars, Filth in Foods, Food and Drug Libels, Expert Testimony

1403 Eutaw Place — Baltimore 17, Maryland

INGREDIENTS For the Food Processor

CARROT OIL makes foods golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET

New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

CLASSIFIED SEARCHLIGHT SECTION ADVERTISING

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:

$1.20 a Line—Minimum 3 Lines.

To figure advance payment count 5 average words as a line.

POSITION WANTED & INDIVIDUAL SELLING OPPORTUNITY undisplayed advertising rate is one-half of above rate, payable in advance.

PROPOSALS, $1.20 a line an insertion.

INFORMATION:

BOX NUMBERS count as one additional line.

DISCOUNT of 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals).

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

DISPLAYED RATE.

The advertising rate is $11.50 per inch for all advertising appearing on other than a contract basis. Contract rates on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

NEW ADVERTISEMENTS Address New York Office, 330 W. 42nd St., New York 36, N. Y., for the September Issue closing August 26th

SALES ENGINEER

For position in expanding technical department. Opportunity for graduate mechanical or chemical engineer with experience in plant layout or sales, preferably in the food industry. Give personal history, experience, education and references. Salary commensurate with ability and experience.

Write R. R. Rammel

FOOD MACHINERY & CHEMICAL CORPORATION

Canning Machinery Division

Hoopeston Illinois

NUTRITIONISTS

Contact Rep., One with California exp. in "feeds". Should have Agric. major. $10,000

Chem. Ph.D. deg.; animal nutrition b'kgr'd. 8,500

"Many Junior Positions"

Call, write or wire:—Gladys Hunting (Consultant)

DRAKE PERSONNEL

7 W. Madison St. Chicago 2, Ill.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

CHEMIST—PREFERABLY familiar with food products, between thirty and forty years of age; permanent position with moderately large company. Please give all relevant details and expected starting salary. Confidential. P-4813, Food Engineering.

FOOD TECHNOLOGIST. Doctor's or Master's degree in Food Technology. Experienced and capable of developing variety of perishable and semi-perishable foods for fleet of 40° - 50°F. wholesale food trucks. Permanent position in new research laboratory with old established New England company. Present detailed resume of training and experience. Replies confidential. P-4907, Food Engineering.

RESEARCH EXECUTIVE. Large Eastern Food Manufacturer has opening for Research Executive. Should have Ph.D. degree in Chemistry or Biochemistry although degree is not as important as demonstrated research accomplishments. Must have at least 5 years experience in directing active research program, part of this time at the project level. Must have demonstrated executive ability, be aggressive and have leadership qualities necessary to keep active research program moving at top speed. Age 35-45. Submit complete resume, salary requirements and recent photograph in first letter. P-4535, Food Engineering.

MAN TO mix syrups for large beverage plant in Middle West. Position is permanent. State age, experience, marital status, references, and salary expected. P-4984, Food Engineering.

SELLING OPPORTUNITIES OFFERED

REPRESENTATIVES WANTED. Incandescent, Fluorescent, infra-red heat, photo-flood and photo-flash lamps. Also renewable cartridge and plug fuses, solderless wire connectors and fluorescent starters. Many choice territories available. Send replies to RW-4529, Food Engineering.

SELLING OPPORTUNITIES OFFERED

WANTED: CHEMICAL Engineer for selling and servicing necessary basic ingredient to confectioners, bakers, ice cream and jam, jelly and preserve manufacturers. Preference given to experience in above lines. Must be willing to travel. Our company is large with well established national distribution and excellent reputation. Replies will be considered confidential and should include complete resume of personal qualifications with experience and salary expected. SW-4799, Food Engineering.

EMPLOYMENT SERVICE

SALARIED PERSONNEL $3,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, 241 Orange St., New Haven, Conn.

POSITIONS WANTED

CEREAL AND Baking Technologist seeks unusual opportunity in product development, market development or sales service. Graduate chemist offers unique diversified experience (12 years) encompassing research and development on miscellaneous baked products, prepared mixes, and related cereal foods. Demonstrated ability in commercial baking operations, ingredient selection, formulation, manufacturer, control procedures and sales service. Substantial salary justified. Details upon request. PW 4820, Food Engineering.

DEVELOPMENT ENGINEER—Graduate Mechanical Engineer, 10 years design and production experience desires responsible position on dairy machinery field. PW-4973, Food Engineering.

SALES-PRODUCTION—20 years experience all phases from field-production and National Sales through brokers direct to chains, grocers, etc. All fruits-vegetables, meats, specialities canned and frozen. Married, age 42—Employed, will relocate. PW-4966, Food Engineering.

CHEMICAL ENGINEER: Licensed. Experienced engineering administrator. Six years chief engineer supervising design, construction, maintenance, plus six years production, research, consulting. Distillation, fermentation, food, beverage, chemical industries. Age 35. PW-4854, Food Engineering.

EXPERIMENTAL FRENCH Chef. Wide experience in processed food. Soups and Meats. References, married. Age 57. PW-4302, Food Engineering.

FOOD CHEMIST: 9 years very varied experience in food research and development: bench, kitchen, pilot plant, administrative. Excellent academic and industrial biochemical background. Now employed in supervisory capacity. Age 35, M.S. Single. Desires new position in development or technical service and liason. PW-4448, Food Engineering.

FOOD CHEMIST, Ph.D., Physical Chemistry. Experience in Fundamental and applied research in food field. Executive position desired. N. Y. area preferred. PW-4700, Food Engineering.

WANTED—POSITION in Technical Sales, Food Production or Quality Control by Food Technologist, Ph. D. 12 years experience processing fruits and vegetables. Thorough knowledge USDA and commercial grading. Many contacts in canning and freezing industry. Some knowledge of pesticides. Florida or Gulf Coast area preferred. Reply PW-4749, Food Engineering.

SELLING OPPORTUNITIES WANTED

SALESMAN COVERING Missouri and Kansas seeks product of merit to represent that area. P.O. Box 825, Minneapolis 1, Minn.

20 YEARS SERVICE TO TOP COMPANIES and EXECUTIVES

As the National Clearing House for QUALITY in men and positions—assures you the utmost in understanding and confidential handling of YOUR requirements for a MAN or a POSITION. Write for details:

B. T. BAGLEY

CADILLAC EMPLOYMENT AGENCY

Suite 614 220 S. State St.

Chicago 4, Ill. WAbash 2-4800

COURSES IN FOOD TECHNOLOGY

a. Mathematics and Chemistry of Food Technology
b. Food Analysis
c. Nutrition
d. Canning
e. Freezing
f. Preserving
g. Inspection and Grading according to U. S. D. A. standards
h. Mold Counting and Insect Examination

MEN OR WOMEN; VETERANS OR NON-VETERANS; NIGHT CLASSES

Highly qualified instructors with practical experience and degrees in their respective fields.

MIAMI SCHOOL FOR FOOD PROCESSING SPECIALISTS

P. O. Box 383, Coral Gables, Florida

Telephone: 87-5881

PRODUCTS FOR CANADA

Established Canadian manufacturer-distributor seeks new lines to make and/or sell. Could make from your formula on a royalty or purchase basis.

BO-4237, Food Engineering
330 W. 42 St., New York 36, N. Y.

WANTED

To branch out into the FANCY FOOD LINE such as Fancy Food and Cocktail items.
Have canning and vacuum packing facilities.
Only interested in high quality specialty items suitable for fancy food stores.
Financially able to buy outright formulas, patents and Trade Mark names.

BO-4816, Food Engineering
330 W. 42 St., New York 36, N. Y.

FOOD PLANT WANTED

We are now manufacturing over $20,000,000 in various lines and wish to expand by acquisition of assets or stock of one of more industrial companies. In our negotiations the sellers' problems and wishes will receive full consideration. Present personnel will normally be retained.

Address all replies

"Confidential" C. J. GALE, Sec.

233 Broadway, N. Y. 7, N. Y. BA 7-1819

WANTED

VILTER SNOW-MAKER

W-4786, Food Engineering
330 W. 42 St., New York 36, N. Y.

MODERN REBUILT EQUIPMENT

At Tremendous Savings

UNION Rebuilt Machinery Established 1912

International Stainless Steel Straightline Vacuum Filler, with Automatic Feeder.
Resina Models S and LC auto. Cappers.
Capem E4F 4-Head Rotary Capper.
CRCO New Way MH and Burt adj. Wraparound Labelers.
Stokes & Smith A Transwrap Filler.
Baker Perkins BB, JNM and Readco Heavy Duty 50 to 150 gal. Double Arm Jacketed Mixers, Sigma or Fish Tail Blades.
Day and Robinson 100, 800, 1500, 2000 lbs. Dry Powder Mixers and Sifters.
J. H. Day 75 gal. Imperial Double Arm Steam Jacketed Mixer.
Day, Ross Pony Mixers; 8 and 15 gal.
B. P. type 3500 gal. Steam Jacketed Double Arm Mixer.
Day 650 gal. S. J. Jumbo Mixer.
Stokes, Day, New Era, Hottman Mixers 2 to 3500 gals. with and without Jackets, Single and Double Arm Agitators.
Baker Perkins 150 gal. Unidor Steam Jacketed Double Arm Mixer.
Tri-Colloid 5 Mill and Homogenizer.
Mikro 4TH, 3TH, 1SH Pulverizers; Jay Bee, Schutz O'Neill, Stedman Mills.
Allis Chalmers, Great Western Sifters.
Colton 2, 3 Rotary Tablet Machines.
Pony M and ML Labelrites: Ermold, World Semi and Fully Automatic Labelers.
S. & S G1, G2, G6 Auger Fillers.
F. J. Stokes HG88 Duplex Auger Filler.
Whiz Packer Spee-Dee B3 Filler.
Triangle Package Models G2C, G2S, N2CA Elec-Tri-Pak Fillers.
Horix and Elgin S. S. Rotary Fillers.
Filler 4 head S. S. Auto. Piston Filler.
Stokes, Colton Semi Auto. and Fully Auto. Tube Fillers and Closers.
Amsco and Doughboy Auto. Cellophane Bag Sealers.
Standard-Knapp No. 429 Carton Sealer.
Hudson Sharpe Model 2W6 Campbell Wrapper.
Hayssen 3-7, 4-10, 7-13; Package Machy. Co. FA, FA4, DF, CA2; Miller and Scandia SSU1 auto. Cellophane Wrappers.
Sweetland, Alsop and Ertel Filters.
Huhn Steam and Gas-Fired Rotary Dryers.
Pneumatic auto. Cartoning Unit, 60 and 30 per min.
Consolidated 13" Macaroni Presses.
Battery of Grimolas and Macaroni Mixers.
Clermont Auto. Noodle Cutter.
Clermont Reversible Dough Brake.

Additional Information and Prices Available on Request

UNION STANDARD EQUIPMENT CO.
318-322 Lafayette Street New York 12, N. Y.

TOP PRICES PAID FOR YOUR SURPLUS EQUIPMENT

WANTED

TO EXPEDITE PRODUCTION

Food Processing Equipment including Aluminum and S/S Kettles, Mixers, Vacuum Pins, Dehydration equipment, Grinders, Elevators, Stills, Colloid Mills, Conveyors, Filters, Packaging Units, Wrapping Machines. Will consider a set up plant now operating or shut down. When offering give full particulars.

P. O. Box 1351,
Church Street Sta., New York 8, N. Y.

Charles S. JACOBOWITZ *Co.*
3083 MAIN STREET · BUFFALO 14, N. Y. · AMHERST 2100

EQUIPMENT WANTED!

We are interested in purchasing good late model equipment including fillers, cappers, labelers, tanks, plate and frame and powder filters, mixers, kettles, etc.

Be sure that we have your listing of surplus equipment, and you will be pleased with the way we work. No obligation on your part.

Also remember, if you have any equipment requirements, we will be glad to assist you. Perhaps we can work out a mutually satisfactory "trade deal"

Serving American Industry for over 30 Years

BUY FROM RELIABLE DEALERS

3—Type 316 S.S. Jack. & Ag. Tanks—300 gals.
1—Premier 6" S.S. Colloid Mill
1—New Tolhurst 48" S.S. Centrifuge Center Slung
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take a CLOSER LOOK at B&W STAINLESS TUBING

. . . and your FABRICATING OPERATIONS

Fast, economical, and satisfactory fabrication of stainless tubing calls for a close watch between its tough working properties and the production methods required to work the tubing to specific job requirements. It is well to bear in mind that the large number of available stainless analyses vary widely in their hot and cold working properties, as well as in their chemical and physical characteristics. Matching the workability of both seamless and welded stainless grades to spinning, swaging, expanding, upsetting, bending, forming, and other fabricating methods is a specialty at B&W.

Whenever you have a question concerning stainless tubing fabrication — for mechanical or pressure applications—you can count on Mr. Tubes—your local B&W Tube Representative to come up with a sound, practical answer. The incomparable technical service to stainless tube users he represents has saved production time, money, and materials for many a fabricator of stainless tubing.

Always a handy reference on ordinary fabricating techniques is Technical Bulletin TB-1. Send for a copy.

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B&W Croloy	AISI Type No
Croloy 18-8 H-C	302
Croloy 18-8 Si	302B
Croloy 18-8 F-M	303
Croloy 18-8 S	304
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General Offices & Plants
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Alliance, Ohio—Welded Carbon Steel Tubing

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TA-1682S

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GUARD YOUR PRODUCTION AGAINST

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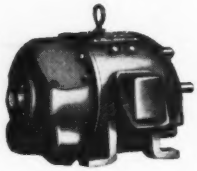
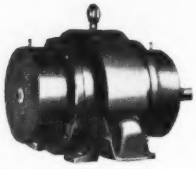
WITH

Century SPLASH PROOF MOTORS

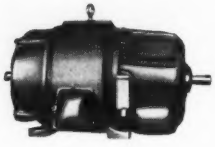
Century 7½ HP Type RS Single Phase Repulsion Start Induction Brush Lifting Splash Proof Motor.



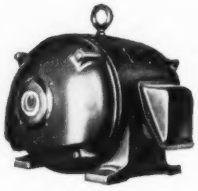
1 to 7½ HP Direct Current Splash Proof Motor.



150 to 400 HP Type SC Squirrel Cage Induction 3 Phase Splash Proof Motors.

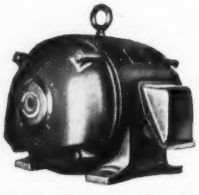


30 to 100 HP Type SR Slip Ring Induction 3 Phase Splash Proof Motors.



1 to 125 HP Type SC Squirrel Cage Induction 3 Phase Splash Proof Motors.

3 to 25 HP Type SR Slip Ring Induction 3 Phase Splash Proof Motors.



1 to 20 HP Type CS Capacitor Start Induction Single Phase Splash Proof Motor.

Keep the vital parts of your motors dry —even when the full force of a hose is turned directly on them. Century Splash Proof motors eliminate production losses due to dripping or splashing liquids or falling solids. They also protect against rain, snow, sleet or hail on outdoor installations.

Century Splash Proof motors are available in a wide range of types and sizes for all popular applications. Other types and ratings are available to meet your electric power requirements. You can specify Century motors with confidence.

Century motors are built in sizes ⅛ to 400 horsepower.

697

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Offices and Stock Points in Principal Cities

For food-plant employees and consultants only . . .

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to obtain further details on equipment, supplies and processes described in editorial and advertising pages of this issue of FOOD ENGINEERING

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TO MAKE IT HANDY

Below is an alphabetical list of products and new literature described in advertisements and the following regular departments: New Equipment and Supplies; New Packages and Products; and Just Off the Press.

WHAT THE NUMBERS MEAN

The number after each item in the list is the number of the page it appears on. Where more than one item is described on a page, prefix capital letters indicate position: L,R,T,B,C (left, right, top, bottom, center). Small letters are used to separate several products described in an advertisement. Capital letters following page numbers identify products and literature described in monthly editorial departments.

The same numbers appear on the postcard in numerical order.

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For Food Plant Employees and Consultants Only

Circle the numbers of the items — editorial or advertising—that interest you. Consult listings above and on following page for the correct number.

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AUGUST, 1952

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FOOD ENGINEERING

330 West 42nd Street

New York 36, N. Y.

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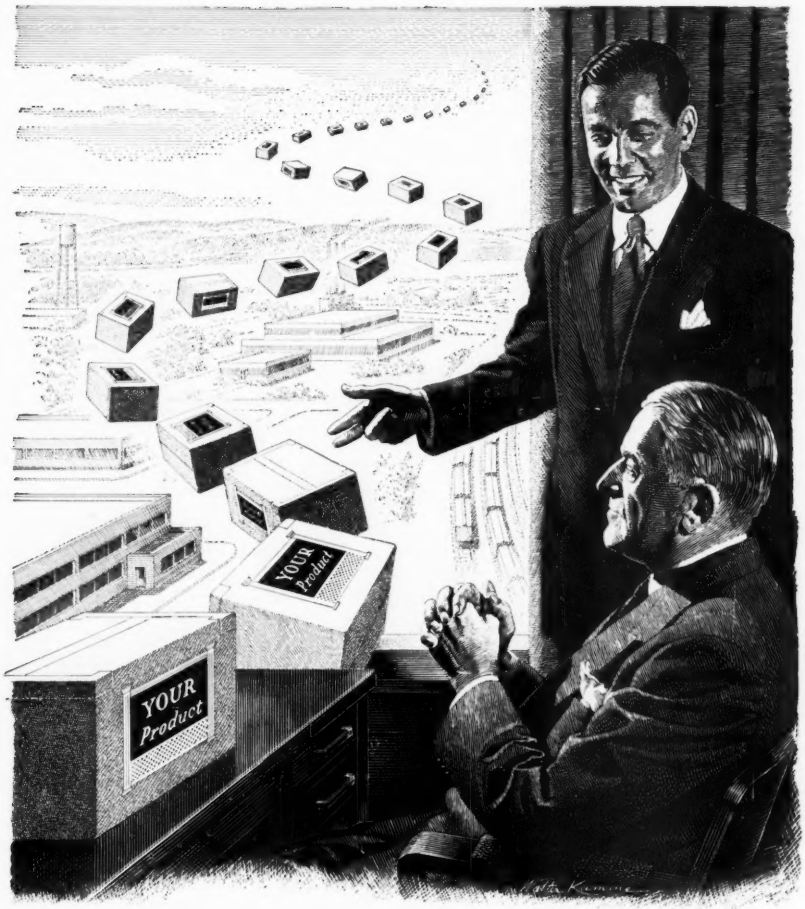
AUGUST, 1952



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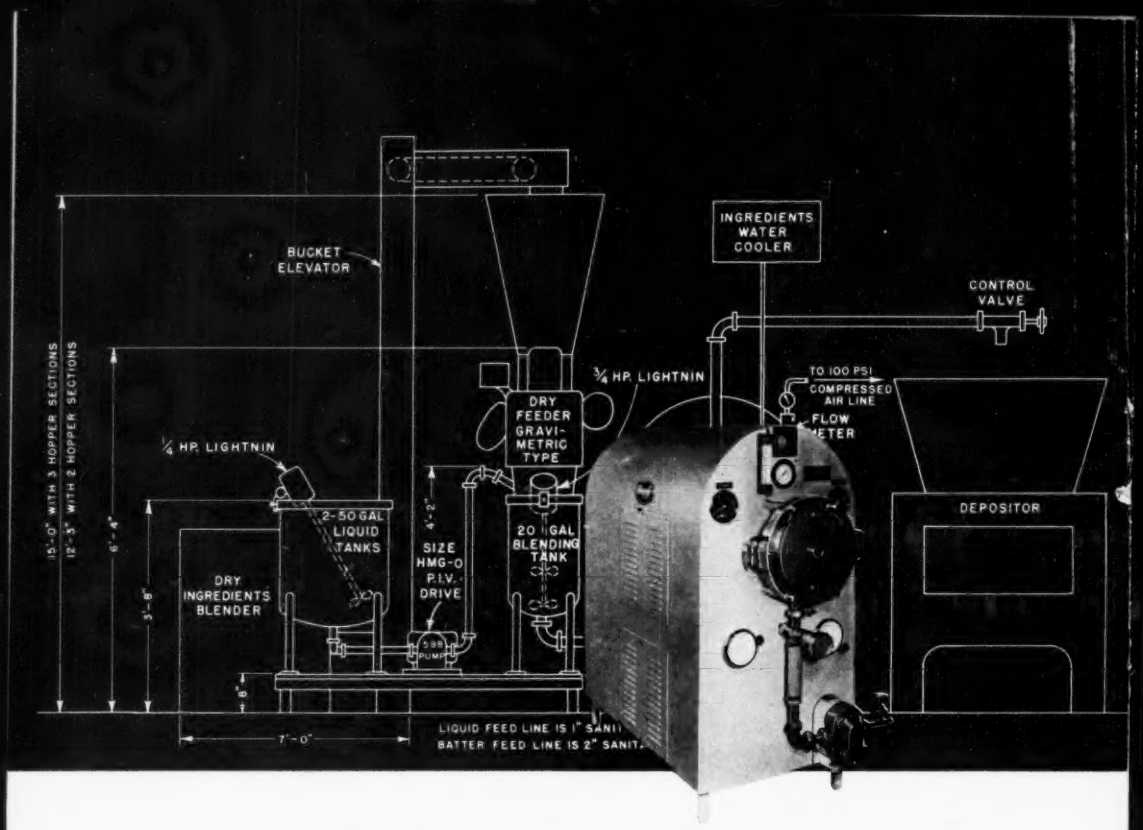

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- Benj. Franklin Dough Mixers
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- Glen Vertical Mixers
- Top Labeler with Imprinter
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